File No. 1410/7010-20
Form C28-0351-5

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IBM 1410/7010 Operating System (1410-PR-155)

Operator's Guide

This publication provides operating personnel with machine-room information on the IBM 1410/7010 Operating System. The publication contains information on: procedures for System Generation, initialization, reinitialization, and restarting the Operating System; arrangement of control-card decks, and formats and examples of the cards; use of the Simultaneous Peripheral Operation On Line (SPOOL) feature; assignment of input/output units; use of the Peripheral Output Writer (POW) program; use of console inquiries; and actions required to respond to control messages from the System.

The reader of this publication should have a basic operating knowledge of the IBM 1410 or 7010 Data Processing System, and should be familiar with the contents of the publication *IBM 1410/7010 Operating System; Basic Concepts,* Form C28-0318.

NOTE: The IBM 1302 Disk Storage Unit is now designated the IBM 2302 Disk Storage Unit; there has been no change in the unit itself, in the applications for which the unit may be used, or in the programming parameters used to specify those applications. References in this publication to IBM 1302 Disk Storage Units should be understood to be references to IBM 2302 Disk Storage Units.

MAJOR REVISION (February 1967)

This publication is revision of *IBM 1410/7010 Operating System; Operator's Guide,* Form C28-0351-4, which is now obsolete. The revision also incorporates and obsoletes Technical Newsletter N27-1236, and includes changes and additions on Utility Program Control Cards and Console Messages From IBM Programs. In addition, the publication has been changed to adhere to IBM Corporate Systems Practice, which states that the graphic zero (Ø) will be slashed, and the graphic letter "O" will not be slashed. All changes in the text are indicated by a vertical line to the left of the affected text; figure and table changes are indicated by a bullet(•) to the left of the affected figure/table caption.

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Contents

This *Operator's Guide* is for the use of personnel involved in the machine-room operation of the IBM 1410/7010 Operating System. The material in this guide is arranged to facilitate quick reference to information needed during the running of programs under the Operating System.

The publication explains: the procedures for System Generation; the steps for initializing, reinitializing, and restarting the system; the use of SPOOL (Simultaneous Peripheral Operation On Line), a program enabling card-to-tape, tape-to-card, and tape-to-printer operations to be carried out concurrent with, but under control of, the Operating System; the use of POW (Peripheral Output Writer), an IBM 1401 program for printing and/or punching the contents of the Standard Print Unit and/or Standard Punch Unit tapes; assignment of input/output units; how and when to make console inquiries; and how to respond to messages issued by the Operating System.

A list of all console messages that may be issued is also included. This listing includes the operator action to be taken should the message appear; suggested corrective action to be taken by the operator or programmer is also indicated where applicable. This list, used in conjunction with information in the sections on control card formats and Standard Input Unit deck sequence, can help speed the correction of any error situations that may arise.

In appropriate places in the text of this publication, space is provided for the installation to record information on its particular configuration of symbolic units used, and input/output assignments.

The reader of this publication should be familiar with the fundamental concepts and terminology of the Operating System as presented in the publication *IBM 1410/7010 Operating System; Basic Concepts,* Form C28-0318. (Systems personnel should also have read the publication *IBM 1410/7010 Operating System; System Monitor,* Form C28-0319.)

Types of Initialization Procedures

In general usage, the term *initialization* covers any procedure that involves preparing the machine and/or programs for work. For purposes of this section, however, initialization refers only to the procedure used, so to speak, at the beginning of the day. Initialization procedures with a Tape System Operating File and a Disk System Operating File are described at the end of this section in Table I and Table II, respectively. *Reinitialization* is the procedure used to begin again, and is usually occasioned by a machine or program failure that makes it necessary to reload the System Monitor. The Operating System also provides restarts from checkpoints; the procedure for restarting is discussed in the "Restarting from a Checkpoint" section.

Initialization Cards

One of the functions of the System's Initialization routine is the processing of cards that contain "daily information" for the system. These Initialization cards, which are placed at the beginning of every Standard Input Unit deck, consist of a DATE card and ASGN cards.

NOTE: *Only* a DATE card, a SPOOL card, and ASGN cards are acceptable prior to the first JOB card. (These cards are described under "Control Card Formats.")

ASGN cards for the following files can be included in the packet of Initialization cards:

Any Work file (MWn)
Any Tele-processing system file (MTn)
Any System file, except the System Operating File and Standard Input Unit

Figure 1 is provided for the installation to check off those System files it wishes to assign via the Initialization cards. Space is also provided for Work files and Tele-processing system files. Note that if an assignment for a file was given during System Generation, an ASGN card for that file is required only if the System Generation assignment is to be temporarily changed. If the Standard Print Unit, Standard Punch Unit, and Core Image file are included in the installation but not assigned during System Generation, and the variable print and punch modules have not been specified, these system files must be assigned via the Initialization cards. If the Standard Print Unit, Standard Punch Unit, and Core Image file are included in the installation, and the variable print and punch modules are selected, these system files can be assigned at System Generation, Initialization, or any time the Transitional Monitor is called. (See the *System Monitor* publication.)

System File Name	ASGN Card Symbol	Included In Installation ?	Assigned at Sys. Gen. ?	Assign by Init. Cards ?
System Operating File	SOF	Yes	Yes	No
Standard Input Unit	SIU	Yes	Yes	No
Alternate Input Unit	AIU*			
System Library File	LIB*			
Standard Print Unit	SPR			
Standard Punch Unit	SPU			
Core Image File	MDM			
TP Library File	MLT**			
Temporary Storage File	MDT**			
Work Files				
Tele-processing System Files				

* ASGN cards for the Alternate Input Unit and System Library File can be included in the Initialization cards and/or throughout the jobs in the batch. In a tape-oriented system, if the Library is not assigned to a physical unit other than the System Operating File, the Monitor assumes the Library is on the System Operating File.

** These can be assigned any time the TP complex is not open.

Figure 1. File Assignments Work Chart

NOTE: Although the system will accept ASGN cards for the Go file and Job file during initialization, such assignments would be pointless, since the first JOB card would cancel them before they were used.

Initialization Status Character

Before bringing the Bootstrap routine into core storage (using the instructions below), the operator enters a character into location 00000. (A blank in location 00000 signals the Transitional Monitor that the system is not in initialization status.) The initialization status character informs the Initialization routine of the type of procedures to be used, as follows:

A—*Initialization.*
B—*Reinitialization with rewind.* (Initialization cards are the first cards read from the Standard Input Unit. That is, Standard Input Unit *tape* is auto-

matically rewound, or Standard Input Unit *card reader* is run out and Initialization cards are placed first in the hopper.)

C—*Reinitialization without rewind.* (Standard Input Unit is in the same position as it was when the situation necessitating reinitialization occurred.)

D—*Restart from checkpoint.* (See "Restarting from a Checkpoint" section.)

By entering a word mark over the initialization status character, the operator can instruct the Initialization routine to accept a change of assignment for the System Operating File and Standard Input Unit. The new assignment(s) can be entered when the message ENTER SOF/SIU ASGN SYMB appears on the console printer. (See the "Console Messages from IBM Programs" section.)

Reinitialization with Rewind

For a Tape System Operating File

1. *Card Standard Input Unit:* Run out cards; place Initialization cards in hopper, followed by next job(s) to be processed from Standard Input Unit.

Card Alternate Input Unit: If assigned *and active* at time reinitialization becomes necessary, run out cards and place in the hopper the job to be processed next.

NOTE: A tape Standard Input Unit will be rewound by the Initialization routine. A tape Alternate Input Unit will also be rewound if a job number is entered for it, as explained in step 3 below.

2. Follow normal initialization procedure, as described in Table I, except enter "B" instead of "A" as the status character.

The Initialization cards from the Standard Input Unit will now be processed.

3. The message ENTER JOB NUMBERS will appear on the console printer. Refer to the console printer sheet for the last line of JOB card information for a tape Standard Input Unit and tape Alternate Input Unit. The two-digit job number appears immediately before "JOB" on the console printer sheet. Press INQUIRY REQUEST. Type in a total of four characters. The first two characters are the last job number for a tape Standard Input Unit, *or* two zeros for a card Standard Input Unit. The last two characters entered are two blanks if processing is *not* to be resumed from the Alternate Input Unit. If processing is to be resumed from the Alternate Input Unit, the last two characters are the last job number for a tape Alternate Input Unit, *or* two zeros for a card Alternate Input Unit. Press INQUIRY RELEASE.

The Standard Input Unit will be read forward to the job number specified, *plus one.* The Alternate Input Unit will be read forward to the job number specified, *plus one.* As these units are read, all ASGN cards encountered will be processed. When the units are positioned as directed by the job numbers, the operator will be given the opportunity to enter class B console inquiries (see the "Console Inquiries" section). Processing will be resumed from the Alternate Input Unit if a job number was entered for the Alternate Input Unit; processing will be resumed from the Standard Input Unit if blanks were entered for the Alternate Input Unit.

Table I. Initialization with Tape System Operating File

Using 7010 Load Key:	Not using 7010 Load Key:
1. Ready System Operating File on unit 0, channel 1, and ready Standard Input Unit (and other units, as required). 2. Enter the status character "A" (can have a word mark) into location 00000. 3. Press Load toggle switch to Tape position. (Perform step 3 twice for a System Operating File with an 80-character label; perform it three times for 120-character label.) NOTE: The Asterisk-Insert switch must be set to ON.	1. Ready System Operating File and Standard Input Unit (and other units, as required). 2. Enter ALcBu00012$Ň into location 00000, where "c" and "u" are the channel and unit of the System Operating File tape (need not agree with System Generation assignment): "c" is: %—channel 1, □—channel 2, ?—channel 3, !—channel 4 "u" is: 0-9 Installation standard for System Operating File tape unit: A Ľ — B — 0 0 0 1 2 $ Ň ("A" can have a word mark.) 3. Press COMPUTER RESET and then START. (Perform step 3 twice for a System Operating File with an 80-character label; perform it three times for 120-character label.) NOTE: The Asterisk-Insert switch must be set to ON.

• Table II. Initialization with Disk System Operating File

Using 7010 Load Key:

1. Ready Standard Input Unit (and other units, as required). The Bootstrap 1 routine card must be the first card in a card Standard Input Unit or the first record (after labels, if any) on a tape Standard Input Unit. (This card is produced by the System Generator Disk Loader program and is shown below.)
2. Enter the status character "A" (can have a word mark) into location 00000.
3. Press Load toggle switch to Card position for a card Standard Input Unit or to Tape position for a tape Standard Input Unit.
   (For a tape Standard Input Unit, perform step 3 twice for a tape with an 80-character label; perform it three times for 120-character label.)

NOTE: The Asterisk-Insert switch must be set to ON.

Not using 7010 Load Key:

1. Ready Standard Input Unit (and other units, as required). The Bootstrap 1 routine card must be the first card in a card Standard Input Unit or the first record (after labels, if any) on a tape Standard Input Unit. (This card is produced by the System Generator Disk Loader program and is shown below.)
2. Enter ALcde00012$ŭ into location 00000, where "c" and "r" indicate the channel of the Standard Input Unit:

   "c" is:
   %—channel 1
   □—channel 2
   ?—channel 3
   !—channel 4

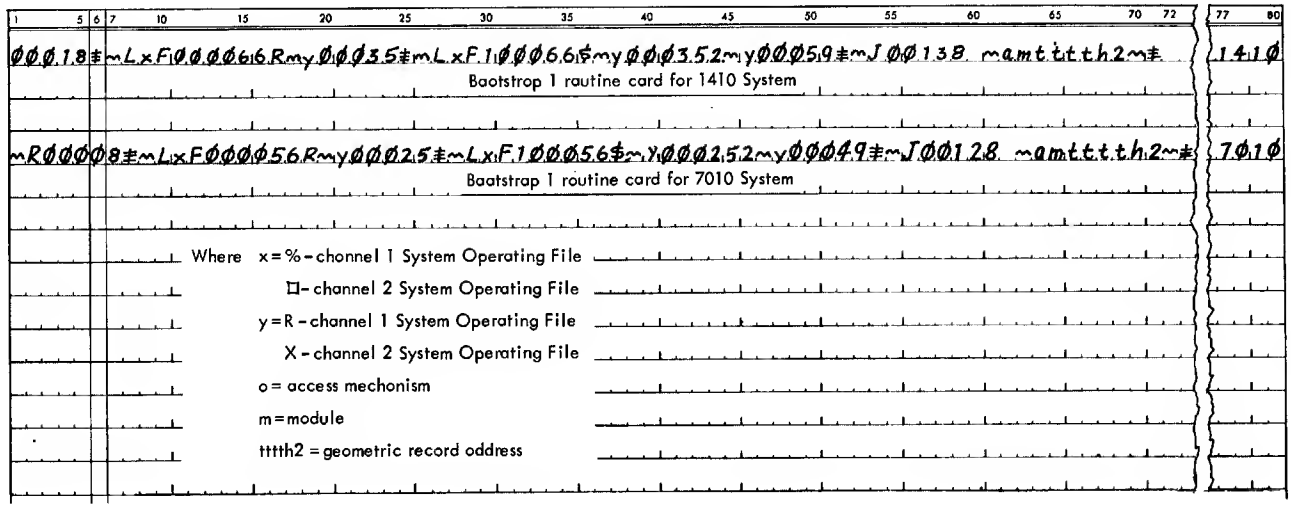
   "d" is:
   1—card reader
   B—tape

   "e" is:
   0—card reader
   0-9—tape

   "r" is:
   R—channel 1
   X—channel 2
   3—channel 3
   1—channel 4

   Installation standard for Standard Input Unit:
   A L ___ ___ ___ 0 0 0 1 2 $ ___ ("A" can have a word mark.)
3. Press COMPUTER RESET and then START.
   (For a tape Standard Input Unit, perform step 3 twice for a tape with an 80-character label; perform it three times for 120-character label.)

NOTE: The Asterisk-Insert switch must be set to ON.



For a Disk System Operating File

Follow the directions under "For a Tape System Operating File." In a card Standard Input Unit, the Bootstrap 1 routine card will be the first Initialization card. For step 2 above, follow the normal initialization procedure, as described in Table II, except enter "B", instead of "A", as the status character.

Reinitialization without Rewind

For a Tape System Operating File

This type of reinitialization can be employed only if the Standard Input Unit (and Alternate Input Unit, if applicable) is in exactly the same position as it was when the need for reinitialization occurred. Furthermore, the Standard Input Unit must be a tape for this type of reinitialization, because the Initialization routine uses the backspace instruction. (For the same reason, blanks must be entered for the Alternate Input Unit job number, unless the Alternate Input Unit is a tape.)

The procedures for a tape System Operating File are:

1. Make certain all required units are ready.
2. Follow normal initialization procedure, as described in Table I, except enter a "C", instead of an "A", as the status character.
3. Enter initialization information as it is requested. (The "Console Messages from IBM Programs" section describes these requests.)

4. When ENTER B MESSAGES is typed and the system contains a Core Image file, the $B4 console entry should be used to close and open a new Core Image file.

For a Disk System Operating File

This type of reinitialization can be used only if the Standard Input Unit (and Alternate Input Unit, if applicable) is in exactly the same position as it was when the need for reinitialization occurred. The Standard Input Unit must be a tape. (Blanks must be entered for the Alternate Input Unit job number, unless the Alternate Input Unit is a tape.) Furthermore, the MDRI/ entry point in the Resident Monitor must be present. (The absolute address of the MDRI/ entry point is determined from a memory map of the Resident Monitor.)

The procedures for a disk System Operating File are:

1. Make certain all required units are ready.
2. Enter "C" into location 00000.
3. Give control to the absolute address of the MDRI/ entry point.
4. Enter initialization information as it is requested. (The "Console Messages from IBM Programs" section describes these requests.)
5. When ENTER B MESSAGES is typed and the system contains a Core Image file, the $B4 console entry should be used to close and open a new Core Image file.

Initialization of the TP Complex

The entire TP complex, including all the files associated with Tele-processing devices, is initialized by a Monitor control card or console inquiry directed to the Tele-processing Supervisor. (This initialization, which is called opening the TP complex, can include the loading of TP programs into core storage.) Similarly, the TP complex is closed by means of a Monitor control card or console inquiry. Before the TP complex is opened, all TP system files needed must be assigned and, if a Program Transmission Control unit is used, it must be loaded with a program.

The following Monitor control card is used to open the TP complex:

Column:	6	16	21
Contents:	MON$$	TP	AOPEN

The following Monitor control card is used to close the TP complex:

Column:	6	16	21
Contents:	MON$$	TP	ACLOSE

The following messages from the console cause the Supervisor to open or close the TP complex:

```
$90bAOPEN
$90bACLOSE
```

The control card for opening or closing the TP complex is placed in the Standard (or Alternate) Input Unit among Monitor control cards anywhere after the first JOB card or the input unit's Monitor END card. A console inquiry for opening or closing the TP complex can be made at any time.

This section describes the basic principles of sequencing used for the Standard Input Unit deck. The descriptions assume that the reader is familiar with the basic functions of the various Monitor control cards. The publication *System Monitor* describes these functions in detail; the role of each Monitor control card is also indicated in the "Control Card Formats" section of this publication.

Functional Components of the Standard Input Unit Deck

Figure 2 illustrates control cards from the Standard Input Unit as they are recognized in functional groups by the System Monitor. (For this section, discussion of the Standard Input Unit is equally applicable to the Alternate Input Unit, with the exception that Initialization cards are not part of an Alternate Input Unit batch.) The following rules apply to the overall sequencing of the Standard Input Unit deck:

The Initialization cards must be the first cards in the deck. (Initialization cards are discussed in the "Initialization and Reinitialization" section.) These cards are processed only when initialization, reinitialization, or restart procedures are performed. They are bypassed at all other times.

The first card after the Initialization cards must be a JOB card.

The last card in every batch must be a Monitor END card.

Sequencing Cards within a Job

A job can consist of one or more runs. The beginning of a job is signaled to the Monitor by a JOB card; each run contains one EXEQ card, usually at its beginning. Within one job, EXEQ cards can be given for any combination of runs, which should perform a logically related sequence of functions. For example, a job could consist of the execution of a language processor, the execution of the Linkage Loader to process the compiled object program, the execution of the object program for testing, and then the execution of Utility programs to record the results of the test. Figure 3 illustrates the Standard Input Unit cards for such a job.

Several general rules must be observed in the sequencing of cards for any job:

1. The first card must be a JOB card.
2. ASGN cards for particular input/output units and files must precede the EXEQ card for the program that will use those units and files.
3. Cards read from the Standard Input Unit by the program named in an EXEQ card must immediately follow that EXEQ card.
4. A MODE card must precede the EXEQ card(s) for the program(s) to which the MODE card applies.

Beyond the general rules of sequencing stated above, the user is free to use control cards to define a job in any manner that best suits his requirements. It should be noted, however, that particular attention should be given to the use of ASGN cards, since operating efficiency is largely dependent upon proper and effective assignment of the installation's available input/output equipment. The "Assignment of Input/Output Units" section contains information concerning input/output assignment.

Examples

The remainder of this section contains examples illustrating the application of the general sequencing rules to specific jobs. The examples serve two purposes: first, they illustrate the sequencing rules; and second, they provide a reference for checking the cards required for jobs involving particular IBM-provided programs. Lower case letters indicate that one of several entries can be made for the positions represented. The entries that can be made for each particular card type are described in the "Control Card Formats" section.

Tape Sort Definition Program

The tape Sort Definition program can be placed in absolute format on the System Operating File in either of two ways: (1) by including the absolute-format tape Sort Definition program (provided on the Master file for a tape-oriented system) on the System Operating File at System Generation; and (2) by relocating the relocatable-format tape Sort Definition program (a program in the Relocatable Library) at System Generation. If, through either of these methods, the Sort Definition program resides in absolute format on the System Operating File, the following sequence of cards can be used to define and execute a tape sorting program:

LABEL	OPERATION	OPERANDS	COMMENTS
MON$$	JOB	jobname	"jobname" is the name of the job.
MON$$	ASGN	MJB,an	"an" is a tape physical unit symbol (e.g., A1).
MON$$	ASGN	MW2,am	"am" must be a physical unit symbol (e.g., A2) for a *tape* unit.
MON$$	EXEQ	SORTDEFINE	
progname	DSORT	(parameters)	"progname" is the name assigned to the sort program. The presence and absence of parameters provide the information necessary for defining the sort program. For example, if user-written modification routines are to be included, the MOD parameter must be specified.
	DUNIT	(parameters)	The parameters define symbolic units for "progname". The meaning of the parameters is based on their relative order.
(relocatable modification routine headed by a TITLE card)			If a user-written modification routine is to be included, and the routine is in punched card format, the cards must be placed here. The routine must be headed by a TITLE card and must be in relocatable format. The program exit point at which the routine is to be placed (e.g., exit P32) must appear in columns 1-3 of the TITLE card. If more than one modification routine is included, the routines must be in order by exit point. Since the user elects whether or not to activate an exit point, these cards are optional.
.	.	.	
.	.	.	
.	.	.	
	CALLN	modroutine	If a user-written modification routine is to be included, and the routine resides in a library or on the Go file, a CALLN card for that routine is placed here. "modroutine" is the name of the routine. The exit point at which the routine is to be placed must appear in columns 1-3 of the CALLN card. "modroutine" must be in relocatable format. Since the user decides whether or not to activate an exit point, this card is optional.
MON$$	EXEQ	LINKLOAD	
	INPUT	MW2	
.	.	.	ASGN cards for symbolic units used by "progname".
.	.	.	
.	.	.	
MON$$	EXEQ	progname,MJB	
SORTTYPE	SORT	(parameters)	Control cards for sort program "progname". Minimum of four (at least one of each type) required.
INPUTFILE	SORT	(parameters)	
OUTPUTFILE	SORT	(parameters)	
CNTLFLDS	SORT	(parameters)	
LABELDES	SORT	(paramcters)	Optional control card for sort program "progname".

If the tape Sort Definition program is in a library in relocatable format, the following sequence of cards can be used to define and execute a tape sorting program:

LABEL	OPERATION	OPERAND(S)	COMMENTS
MON$$	JOB	jobname	"jobname" is the name of the job.
MON$$	ASGN	MJB,an	(see previous example)
MON$$	ASGN	MW2,am	(see previous example)
MON$$	ASGN	LIB,ap	"ap" is a physical unit symbol (e.g., A3). In a tape-oriented system, the library need not be assigned if it is on the System Operating File. In a disk-oriented system, the library must be assigned.
MON$$	EXEQ	LINKLOAD,,,libname	"libname" is the name of the library on physical unit "ap". In a tape-oriented system, the three commas and "libname" may be omitted if the relocatable Sort Definition program is in the relocatable library (IBMLIBR) on the System Operating File. In a disk-oriented system using a disk System Library file, the three commas and "libname" should be omitted.
	PHASE	SORTDEFINE	
	CALL	IBSRTDEFIN	
MON$$	EXEQ	SORTDEFINE,MJB	

LABEL	OPERATION	OPERAND(S)	COMMENTS
progname	DSORT	(parameters)	(see previous example)
	DUNIT	(parameters)	(see previous example)
(relocatable modification routine headed by a TITLE card)			Optional (see previous example).
.	.	.	
.	.	.	
.	.	.	
	CALLN	modroutine	Optional (see previous example).
MON$$	EXEQ	LINKLOAD	
	INPUT	MW2	
.	.	.	ASGN cards for symbolic units used by "progname."
.	.	.	
.	.	.	
MON$$	EXEQ	progname,MJB	
SORTTYPE	SORT	(parameters)	Control cards for sort program (see previous example).
INPUTFILE	SORT	(parameters)	
OUTPUTFILE	SORT	(parameters)	
CNTLFLDS	SORT	(parameters)	
LABELDES	SORT	(parameters)	

Compile-and-Go

The following sequence of cards can be used for the execution of a "compile-and-go" type operation:

LABEL	OPERATION	OPERAND(S)	COMMENTS
MON$$	JOB	jobname	"jobname" is the name of the job.
MON$$	ASGN	MJB,an	"an" is a physical unit symbol (e.g., A4).
MON$$	ASGN	MGO,am	"am" is a physical unit symbol (e.g., A5).
.	.	.	ASGN cards for Work files, if not currently assigned.
.	.	.	
.	.	.	
MON$$	MODE	GO,TEST	TEST is an optional operand.
MON$$	EXEQ	AUTOCODER	This operand could also be COBOL or FORTRAN.
.	.	.	Cards for source program "henry".
.	.	.	
.	.	.	
MON$$	ASGN	LIB,ap	"ap" is a physical unit symbol (e.g., A6). A library is required in the processing of output from the COBOL and FORTRAN compilers; it is optional for Autocoder output. In a tape-oriented system, the library need not be assigned if it is on the System Operating File. In a disk-oriented system, the library must be assigned.
MON$$	EXEQ	LINKLOAD, , ,libname	"libname" is the name of the library on physical unit "ap". In a tape-oriented system, the three commas and "libname" can be omitted if the library is part of the relocatable library on the System Operating File. In a disk-oriented system using a disk System Library file, the three commas and "libname" should be omitted.
.	.	.	Linkage Loader control cards for processing "henry".
.	.	.	
.	.	.	ASGN cards for files used by "henry".
.	.	.	
.	.	.	
MON$$	EXEQ	henry,MJB	
.	.	.	Data cards used by "henry" (optional).
.	.	.	
.	.	.	

Storage Print

The following sequence of cards can be used to execute a program and obtain a print-out of the contents of core storage:

LABEL	OPERATION	OPERAND(S)	COMMENTS
MON$$	JOB	jobname	"jobname" is the name of the job.
.	.	.	Cards defining the first part of the job, such as a compilation
.	.	.	followed by an execution of the Linkage Loader.
.	.	.	
MON$$	MODE	TEST	To obtain a Storage Print of a program within the same job, Test mode must be specified.
.	.	.	ASGN cards used by "testprgm".
.	.	.	
.	.	.	
MON$$	EXEQ	testprgm,MJB	EXEQ card for "testprgm".
			Data cards for "testprgm" (optional).
.	.	.	
.	.	.	
.	.	.	
MON$$	EXEQ	UTILITIES	EXEQ card needed for execution of the Storage Print program.
	DUMP	CORE,MDM,xxxxx,start,stop	"xxxxx" can be either ALL, LAST, or the name of the program (e.g., TESTPRGM). ALL prints all storage writes (see "Storage Print Card," under "Utility Program Control Cards," in the "Control Card Formats" section) on the Core Image file. LAST prints an area of the last storage write, as specified in "start" and "stop" (e.g., all or part of TESTPRGM). "name" (e.g., TESTPRGM) prints all programs identified by "name" on the Core Image file.

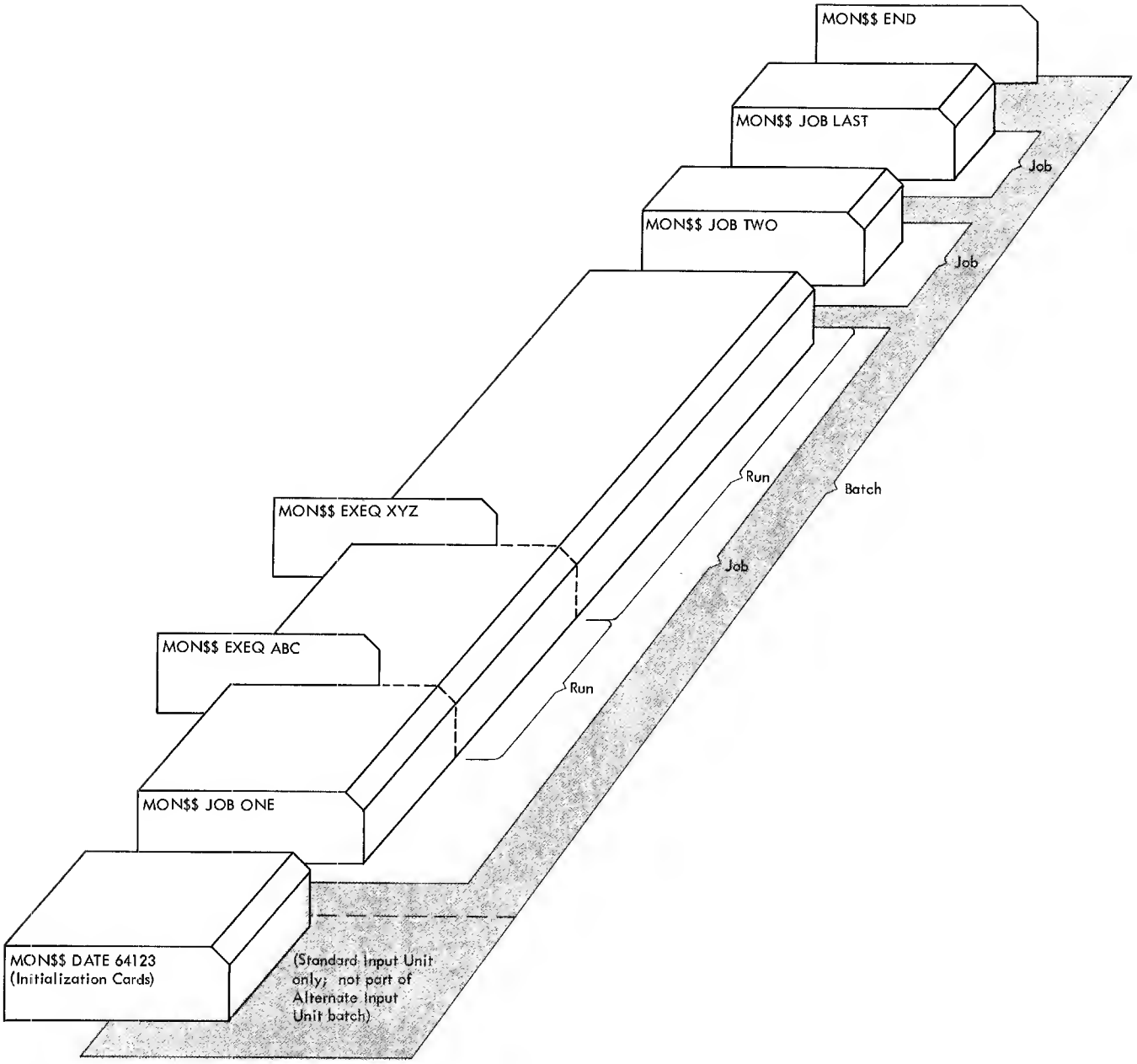


Figure 2. Functional Grouping of Control Cards

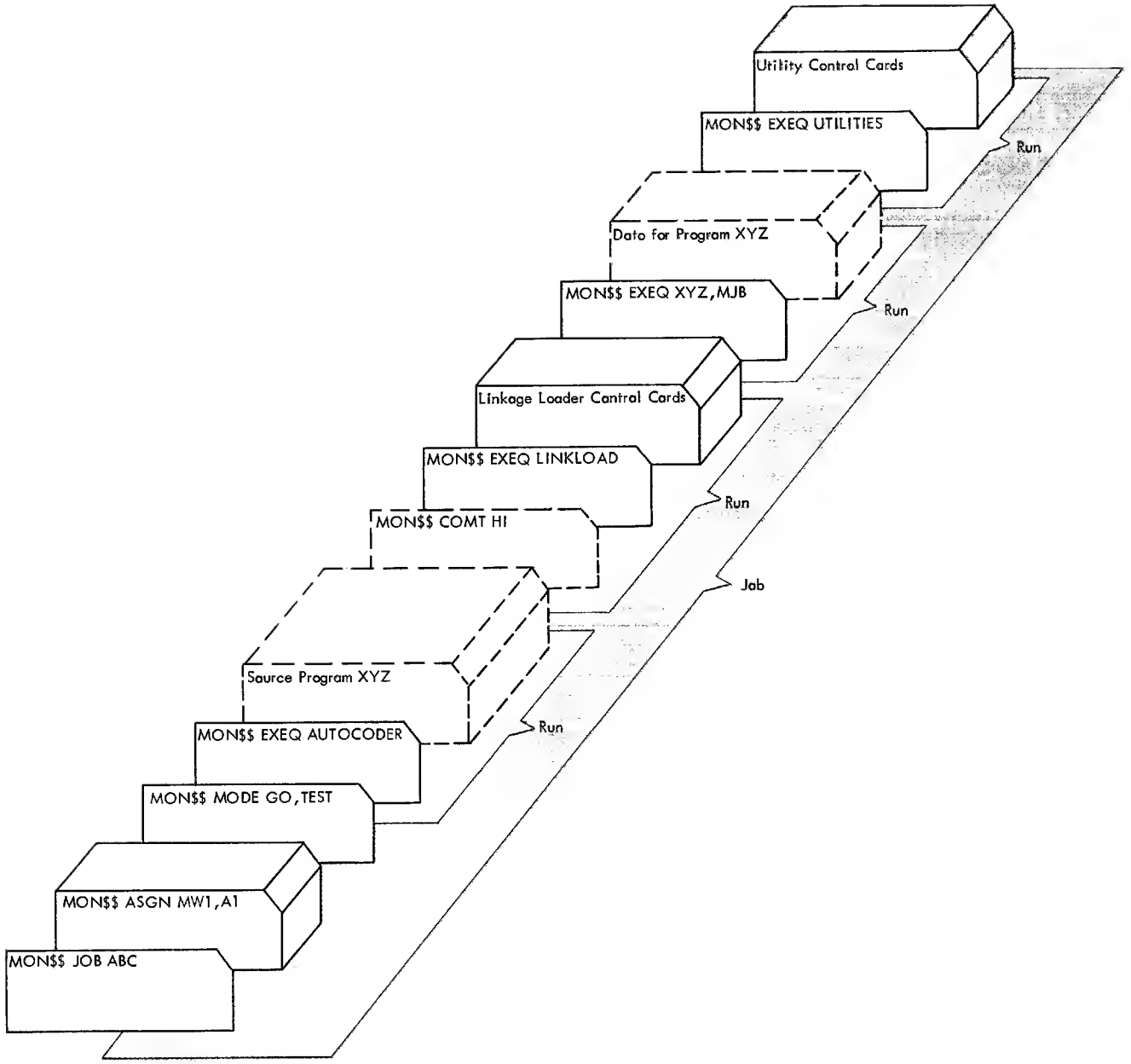


Figure 3. Control Cards for a Job

This section describes the basic principles of the System Monitor's facilities for assigning input/output units, and includes instructions for the use of these facilities. Proper coordination between programmers and operators is essential for the efficient use of these facilities.

Initial Designation of Input/Output Units

At System Generation, the installation defines to the System Monitor the input/output units included in he installation's machine configuration. This procedure establishes the identity of each of the installation's *physical units.* For purposes of the System Monitor's input/output assignment facilities, a physical unit is one of the following:

1. One unit-record device.
2. One tape unit.
3. One set of consecutive tracks in a 1301 or 2302 Disk Storage module (or a set of corresponding record areas within a set of consecutive tracks).

NOTE: The 1402 Card Read Punch must be defined per function. (The read function is specified as one physical unit; the punch function is specified as another.)

The definitions of physical units specified during System Generation are placed into a table in the Resident Monitor.

Later, during operation of the system, this table represents the input/output units that are available for use by dependent programs and by the System Monitor. (This table can be changed, in terms of additions and deletions, only by another System Generation.)

NOTE: Definition of Tele-processing devices is also performed during System Generation but in a different manner. They are defined by specifying the related elements of the Tele-processing Supervisor that are to be included for them. (See *IBM 1410/7010 Operating System; Tele-processing Supervisor,* Form C28-0321.) The definitions of Tele-processing devices are not placed in the Resident Monitor's table. However, physical units used by programs operating within the Tele-processing system (other than Tele-processing devices) are defined in the same manner as physical units used by other programs, and are also placed in the Resident Monitor's table of physical units.

Assignment of Symbols to Physical Units

Included in the definition of each physical unit is the assignment of a two-character symbol to represent that unit. This symbol becomes the name of that unit and, during operation of the system, is used for all assignments for that unit. The use of these two-character symbols, which are termed *assignment symbols,* provides a convenient system of reference for an installation's input/output equipment.

A table is provided later in this section for the installation to record its set of assignment symbols.

Concept of Symbolic Units

In addition to defining an assignment symbol for each physical unit, each installation defines a set of names that are to be used for program references to input/output units. These names are defined during System Generation, at which time they are placed in a table in the Resident Monitor. During operation of the system, this table of names is used in conjunction with the table of physical units to assign input/output units for program use. The names used in program references represent *symbolic units,* since these names are not equated to physical units until the System Monitor receives ASGN control cards that specify which physical units are to be used to meet the program's input/output requirements. (The ASGN control card is described in a following topic, "Control Card for Assignment of Input/Output Units.")

Designation of Symbolic Units

Symbolic units are divided into four groups, in accordance with the type of program that uses the symbolic unit:

1. *System Files* are those used by the System Monitor. System files may not have alternate units.
2. *Work Files* are those used by the language processors.
3. *Reserve Files* are those used by the installation's dependent programs.
4. *Tele-processing System Files* are those used by the installation's programs that operate under control of the Tele-processing Supervisor.

NOTE: Work files can also be used by the installation's dependent programs, but care must be exercised to ensure that conflicts do not arise between assignments for the language processors and assignments for

the installation's programs. Information concerning the proper time of assignment for the various symbolic units is presented later in this section.

The names that can be used for each of the four groups of symbolic units are presented below. For each system file, the name is predetermined; for the other three groups of symbolic units, the names are selected from the specified sets.

System Files:

SOF — System Operating File
SIU — Standard Input Unit
SPR — Standard Print Unit
SPU — Standard Punch Unit
AIU — Alternate Input Unit
LIB — System Library file
MJB — Job file
MGO — Go file
MDM — Core Image file
MLT — TP Library file (for Tele-processing system)
MDT — Temporary Storage file (for Tele-processing system)
SU1 or SU2—SPOOL Unit-Record file
ST1 or ST2—SPOOL Tape file

Work Files:

MW0 (MW-zero) through MW9
MWA through MWZ

Reserve Files:

MR0 through MR9
MRA through MRZ

Tele-processing System Files:

MT0 through MT9
MTA through MTZ

The installation can record its set of symbolic units in Figure 4.

NOTE: Only the symbolic unit names selected by the installation during System Generation can be used by the installation.

Assignment Times for Symbolic Units

The symbolic units are divided into six categories, with respect to the times that they can (or must) be assigned to physical units:

1. Symbolic units that must be assigned during System Generation, and can be reassigned (i.e., assigned to a different physical unit) only during initialization procedures:

SOF (System Operating File)
SIU (Standard Input Unit)

2. Symbolic units that must be assigned at System Generation or during initialization procedures, and can be reassigned only by initialization procedures:

SPR (Standard Print Unit)
SPU (Standard Punch Unit)
MDM (Core Image file)

NOTE: If the variable print and punch modules are selected, these symbolic units may be assigned at System Generation, Initialization, or when the Transitional Monitor is called. The files can be reassigned at Initialization or between runs in a job. Thus, if the variable print and punch modules are chosen, these system files would fall into category three. If the variable print and punch modules are not included, each of these symbolic units must always be assigned to a physical unit if facilities for them were incorporated into the Resident Monitor at System Generation.

3. Symbolic units that can be assigned during initialization procedures and can also be assigned or reassigned between each run within a job:

LIB (System Library file)
AIU (Alternate Input Unit)
MWn (All Work files)

NOTE: The Alternate Input Unit cannot be assigned by an ASGN card that is read from the Alternate Input Unit.

4. Symbolic units that can be assigned between each job and/or between each run within a job:

MJB (Job file)
MGO (Go file)
MRn (All Reserve files)

NOTE: The assignment of these files is canceled by the System Monitor each time it encounters a JOB card.

5. Symbolic units that can be assigned only when the Tele-processing system is *not* open:

MLT (TP Library file)
MDT (Temporary Storage file)
MTn (All Tele-processing system files)

NOTE: The assignment of these units is canceled each time the total System Monitor is initialized or reinitialized. Between initializations or reinitializations of the total System Monitor, these assignments are maintained regardless of the number of times the Tele-processing system is opened and closed. The assignments can, however, be changed by ASGN cards each time the Tele-processing system is closed.

6. Symbolic units that can be assigned only by the class B $B7-type console inquiry or a MON$$ SPOOL card:

SU1 (SPOOL Unit-Record Device on Channel 1)
SU2 (SPOOL Unit-Record Device on Channel 2)
ST1 (SPOOL Tape Unit associated with the SPOOL Unit-Record Device on Channel 1)
ST2 (SPOOL Tape Unit associated with the SPOOL Unit-Record Device on Channel 2)

NOTE: The assignments of these units are canceled when the total System Monitor is initialized or reinitialized. Between initializations (or reinitializations) of the total System Monitor, these assignments are maintained. The assignments can be changed by the $B7 console inquiry.

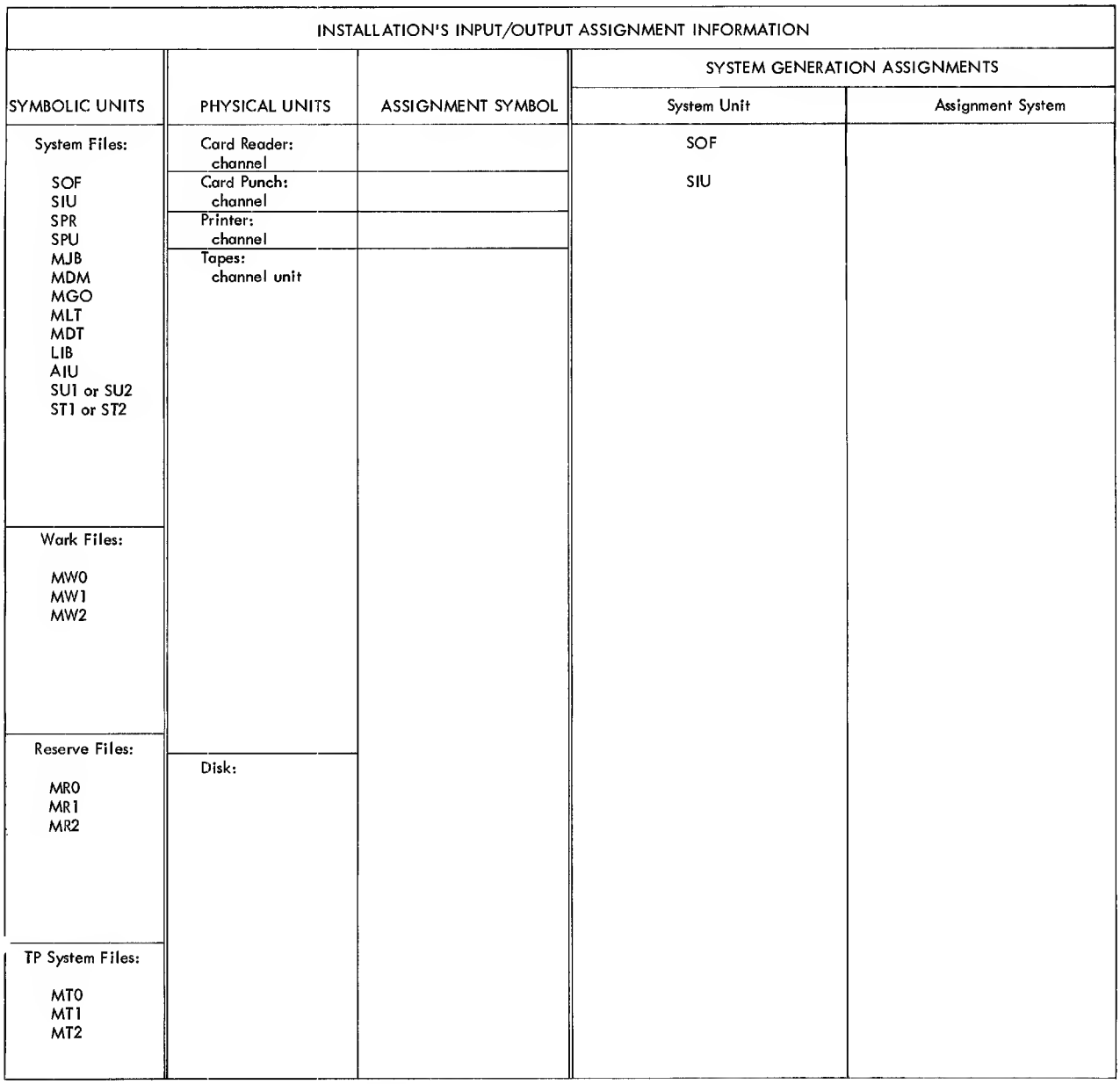


Figure 4. Installation's Input/Output Assignment Information

Program References to Symbolic Units

After the installation has defined a set of names for symbolic units, these names are used in the installation's source programs to designate the symbolic units to be used for a program's files. For example, a programmer writing in the Autocoder language writes a DTF statement that describes a file that his program will use. One of the elements of that DTF statement is the SYMUNIT entry, which establishes a symbolic unit for that file. COBOL and FORTRAN also provide means by which the programmer can specify the symbolic units to be used by a program.

Control Card for Assignment of Input/Output Units

The ASGN control card used for assignment of input/output units is one of the set of Monitor control cards (MON$$ in columns 6 through 10). The ASGN card can be used to direct the Monitor to: (1) assign one or more physical units to a particular symbolic unit; (2) assign one or more physical units to a symbolic unit other than the one to which they were originally assigned; and (3) cancel the assignment of one or more physical units to a symbolic unit.

As shown in Figure 5, the first operand of an ASGN card is the name of the symbolic unit. The second

operand is the assignment symbol for the first physical unit, or *base unit,* to be assigned to that symbolic unit. Additional operands can be used to specify alternate physical units.

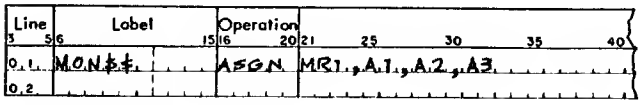


Figure 5. ASGN Card Format

An *alternate unit* is a physical unit supplementing the base unit. When end of reel (for tape operations) or end of disk unit (for disk operations) is reached on the base unit, the IOCS performs the next input/output operation on the first alternate unit, if an alternate unit is specified. Subsequent alternate units are used in the order specified when end of reel or end of disk unit is reached on the preceding unit. If tape units are used, a continuous cycling of physical units can occur; the base unit will be the n(a+1)+1 alternate unit, where a is the number of alternate units specified and n is the number of cycles completed. If disk units are used, the last alternate unit specified is the last physical unit used for that particular assignment. Assignments of alternate units for all symbolic units are canceled by the Resident Monitor each time a JOB card is read.

In the example shown in Figure 5, MR1 is the symbolic unit, A1 is the base unit, A2 is the first alternate unit, and A3 is the second alternate unit. When end of reel or end of disk unit is reached on A1, the next input/output operation is performed with the physical unit represented by A2. When A2 reaches end of reel or disk unit, A3 is used. If these physical units are tape units, the assignment cycles back to A1 when end of reel is reached on A3.

Sharing of Physical Units

A physical unit can be assigned to more than one symbolic unit at the same time. This is done by specifying an additional assignment for the physical unit. For example, a job involving a compile-and-go operation could use a tape unit as a Work file for the language processor, and then use the same tape unit as a Reserve file for the program just compiled. The ASGN cards for the two symbolic units (see Figure 6) can both be placed immediately behind the JOB card for this job. Because no cancellation of assignment is required or involved in this operation, the symbolic units are said to share the physical unit. Both assignments remain in effect until canceled by the user or canceled automatically by the Resident Monitor (see "Cancellation of Assignments").

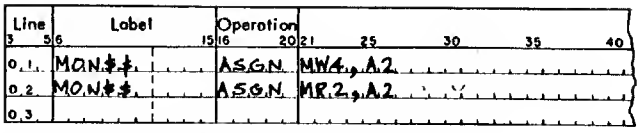
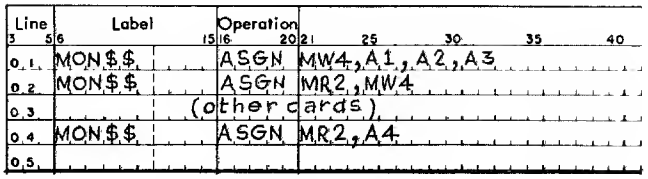


Figure 6. Multiple Assignment of a Physical Unit

A symbolic unit can be assigned to another symbolic unit. In this case, all physical units currently assigned to the second symbolic unit are also assigned to the first symbolic unit. This is also an instance of two symbolic units sharing a physical unit(s). Within a job, this pairing can be broken through a new assignment to the first symbolic unit. This automatically cancels the assignment of the second symbolic unit's physical units to the first symbolic unit. Line 2 of Figure 7 illustrates the assigning of one symbolic unit to another; in this case, all units currently assigned to MW4 are also assigned to MR2. Line 4 severs the pairing. Assignment of A1, A2, and A3 to MR2 is automatically canceled; A4 is the only unit assigned to MR2. A1, A2, and A3 remain assigned to MW4.



● Figure 7. Assignment of One Symbolic Unit to Another, and Automatic Cancellation of the Assignment

If a base unit assigned to one symbolic unit is subsequently assigned to another symbolic unit, all alternate units assigned to the first symbolic unit are also shared by the second. However, if in the second assignment an alternate unit not named in the first assignment is specified, that alternate will not be picked up by the Monitor. For example, assume the following sequence of cards is on the SIU:

```
6          16          21
MON$$      ASGN        MR2,A1,A2
MON$$      EXEQ        PROG1
                .
                .
                .
          (other cards)
                .
                .
                .
           ASGN        MR3,A1
```

In this case, the alternate A2 will also be assigned to MR3. However, assume that this sequence of cards is on the SIU:

```
6          16              21
MON$$      ASGN            MR2,A1,A2
MON$$      EXEQ            PROG2
                .
                .
                .
          (other cards)
                .
                .
                .
           ASGN            MR3,A1,A3
```

In this case, the alternate A2 will be assigned to MR3, but the A3 assignment will be ignored.

A base unit assigned to one symbolie unit cannot be assigned as an alternate unit to another symbolic unit. For example, these two assignments eannot exist simultaneously:

```
6          16              21
MON$$      ASGN            MR1,A1,A2
MON$$      ASGN            MR2,A2
```

However, through the use of the Monitor caneellation of assignment card (see "Cancellation of Assignment"), a physical unit used as an alternate at one point in a job can be used later as a base unit. Similarly, a physieal unit first used as a base unit can be used later as an alternate. For example, assume that the first run in a job is a program that requires symbolie unit MR1 to be assigned physical units A1 and A2. Assume also that the next run in the job is a compilation, and it is neeessary that A2 be used as a Work file for the language proeessor. (The program executed in the first run did not leave any valuable information on A2.) Beeause A2 was assigned as an alternate unit for a Reserve file for the first run, it cannot be assigned as a base unit for the language processor Work file unless the initial assignment is eaneeled. This eaneellation must be done by MON$$ eancellation of assignment eard. Figure 8 is an example of the eontrol cards needed for this operation.

Line	Label	Operation	
0.1	MON$$	JOB	ASGNEXAMP
0.2	MON$$	ASGN	MJB,A3
0.3	MON$$	ASGN	MGO,A4
0.4	MON$$	ASGN	MR1,A1,A2
0.5	MON$$	EXEQ	FIRSTPROG
0.6		(other cards)	
0.7	MON$$	ASGN	MR1
0.8	MON$$	ASGN	MW1,A2
0.9	MON$$	ASGN	MW2,A5
1.0	MON$$	MODE	GO
1.1	MON$$	EXEQ	FORTRAN,,,,7,,PCH,,SECPROG
1.2		(SECPROG source program)	
1.3			

Figure 8. Subsequent Use of an Alternate Physical Unit as a Base Unit

Cancellation of Assignments

There are two types of cancellation of assignments: caneellation by the user through the ASGN card, and automatic cancellation by the Resident Monitor.

Figure 9 and line 7 of Figure 8, show examples of the ASGN eard for canceling assignments. The only operand used is the symbolic unit for which the assignment is caneeled. In Figure 8, the eaneellation card on line 7 permits the physieal unit A2 to be used as a Work file unit in the execution of the FORTRAN processor.

Line	Label	Operation	
0.1	MON$$	ASGN	MR1
0.2			

Figure 9. ASGN Card for Cancellation of Assignment

The Resident Monitor also automatically eaneels certain assignments. As stated previously, assignments of alternate units for all symbolic units are canceled by the Resident Monitor each time a JOB card is read. In addition, all Reserve file, Go file, and Job file assignments are automatically canceled each time a new JOB card is read. Automatic cancellation of Work file assignments takes place only during reinitialization.

Assignment by the uscr of a new base unit to a symbolic unit also results in the automatic eancellation by the Resident Monitor of the previous assignment for that symbolic unit. For example, assume the following sequence of cards is on the SIU:

```
ASGN     MR2,A2
           .
           .
           .
ASGN     MR2,A3
```

In this case, the Resident Monitor automatieally eaneels the first assignment. Another example of this type of automatic cancellation is shown in Figure 7.

Placement of ASGN Card

The ASGN cards, like all other Monitor control eards, are submitted to the System Monitor through the Standard (or Alternate) Input Unit. The relative position of an ASGN card within the control card deek is determined by the category of symbolic unit for which the ASGN card is being used. As described earlier in "Assignment Times for Symbolie Units," symbolic units are divided into six categories with respect to the time they can be assigned. ASGN eards for symbolie units assigned during initialization are included as part of the daily information in the Standard Input Unit. ASGN cards for symbolie units assigned only for the duration of a job must follow the related JOB card and preeede the EXEQ eard for the program that requires the assignments. ASGN cards for symbolic units used by the Tele-processing system must precede the control card that opens the Tele-processing system or

be read before the Tele-processing system is opened by a console inquiry.

Considerations for System File Assignment

The physical units assigned to certain System files cannot be assigned to any other symbolic units during the time they are assigned to those System files. The System files are:

System Operating File (SOF)
Standard Input Unit (SIU)
Standard Print Unit (SPR)
Standard Punch Unit (SPU)
System Library file (LIB)
Core Image file (MDM)
Alternate Input Unit (AIU)
TP Library file (MLT)
Temporary Storage file (MDT)
SPOOL Unit-Record file (SU1 or SU2)
SPOOL Tape file (ST1 or ST2)

In addition, physical units assigned to symbolic units used by the Tele-processing system cannot be assigned to any other symbolic units during the time that the Tele-processing system is open.

If the Standard Print Unit and the Standard Punch Unit are on tape, they can both share the same physical unit. If the variable print and punch modules have been specified, the Standard Print Unit, Standard Punch Unit, and Core Image file can all share the same physical tape unit. If the variable print and punch modules have been selected, the SPU, SPR, and MDM can also share the same physical tape unit with the Temporary Storage file (MDT) when the Tele-processing system is closed.

Assignments for Compilations

Autocoder and COBOL require three Work files; physical units must be assigned to MW1, MW2, and MW3. FORTRAN requires two Work files; physical units must be assigned to MW1 and MW2. If a language processor is run in a compile-and-go operation, the Go file must be assigned to a physical unit other than the ones used for the Work files. Note that alternate physical units cannot be specified on the ASGN cards for any of these files, if they are on tape.

For the greatest efficiency of input/output time during a compilation, the following considerations should be observed when the Work files are on tape (if enough equipment is available):

1. In a compile-and-go operation that also places output on the Standard Punch Unit, the Go file and Standard Punch Unit should be on different channels.
2. For Autocoder, MW2 should be on a different channel from MW1 and MW3.
3. For COBOL, MW1 should be on a different channel from MW2. MW3 should be on a different channel from the output unit(s).
4. For FORTRAN, MW2 should be on a different channel from MW1. The source-program unit and the Go file (and/or Standard Punch Unit) should also be on a channel other than the one used for MW1.

For Work files on disk in an Autocoder compilation, alternate units can be assigned to the Work files. All Work files except MW3 are used sequentially and may have alternate units assigned. MW3 is used as a random file during the macro-instruction generation phases of the Autocoder compilation. If alternate units are to be assigned to MW3, one of the following conditions must be met:

1. The first alternate unit must be large enough to accommodate all the Autocoder Macro Library entries used during any particular compilation. For example, the size required for source programs using IOCS is less than 25 tracks. (The entire IOCS portion of the Autocoder Macro Library occupies less than 25 tracks.)
2. All alternate units assigned to MW3 must have the same HA2 address.

All physical units for MW3 file must be on the same disk module.

Assignments for the Linkage Loader

For every run of the Linkage Loader, the Job file must be assigned. Assignment of the Go file and a library are optional. For a tape-oriented system, a library is assigned as the System Library file (LIB) only if it is on a physical unit other than the one assigned for the System Operating File.

For the greatest efficiency of input/output time, the Job file should be assigned to a channel different from the one used for the Linkage Loader's heaviest input source. The Linkage Loader has three possible system-file input sources: the Standard Input Unit, the Go file, and the System Library file. The INPUT card can be used to direct the program to take control information and/or source information from a Work, Reserve, or Tele-processing file.

Assignments for Sort Definition

For every execution of the tape or disk Sort Definition program, MW2 must be assigned to a *tape* physical unit. If the output of the Sort Definition program is to be immediately processed by the Linkage Loader, MW2 must be indicated as one of the Loader's input sources by either: (1) using the Linkage Loader INPUT card; or (2) specifying MW2 as the third operand of the EXEQ card for the Linkage Loader. (See "Control Card Formats" section for information on the INPUT and EXEQ cards.)

If a large number of user-written modification routines are to be incorporated into the sorting program,

and the modification routines are placed on the Standard Input Unit, MW2 will probably be the Linkage Loader's heaviest input source. (During the execution of the Sort Definition program, routines in relocatable format on the SIU are copied onto MW2.) MW2, therefore, should be assigned to a channel different from the one used for the Job file.

Console Inquiries

Console inquiries are used to communicate control information to various portions of the System Monitor. The messages that can be entered through the console printer are divided into four classes:

Class A: Messages that can be accepted by the Resident Monitor during the execution of a dependent program.

Class B: Messages that can be accepted by the Transitional Monitor when it is in core storage between jobs and between runs within a job.

Class C: Messages that are communicated to the Transitional Monitor in reply to a request from the Transitional Monitor for specific control information.

Class D: Messages that are communicated to the Bootstrap routine in reply to a request from the Initialization routine for specific control information. (These inquiries are described in the section "Console Messages from IBM Programs" under "Initialization Messages.")

In the messages shown, a number, capital letter, or special symbol (e.g., 7, B, $) indicates the entry that must be made for that position in the message. A lower-case letter (e.g., n, xxx) indicates that the letters or numbers that can be placed in this position are variable. A lower case "b" always indicates a blank.

Entering the Console Messages

The various console messages are entered by:

1. Depressing the INQUIRY REQUEST key.
2. Typing in the message.
3. Depressing the INQUIRY RELEASE key.

NOTE: If an error is made during the typing of a console inquiry, the operator should press INQUIRY CANCEL instead of INQUIRY RELEASE. The 10104 REP INQ message is then issued on the console and the operator can key in the correct inquiry message.

The operator must not simultaneously hold down the INQUIRY RELEASE and INQUIRY REQUEST keys.

Class A Messages

The following messages can be accepted during execution of a dependent program. With the exception of the "$90b any input wanted" message and the "$3x any input wanted" inquiry, the entire message in each case consists of the three characters listed.

$10: This message causes immediate entry to the Unusual End of Program routine in the Resident Monitor. The contents of core storage are written on the Core Image file, if this system file is included in the installation's configuration; in addition, if the current job is not being run in Test mode, the remainder of the job is canceled and the Monitor skips to the next JOB card. If the job is in Test mode, subsequent runs within the job are executed. The $10 message can be used only for programs that are not under control of the Tele-processing Supervisor, and can be entered at any time.

NOTE: The operator can also give control to the Unusual End of Program routine by pressing the COMPUTER RESET key and then the START key. This procedure should be used only if a $10 message has failed or if the computer has halted because of an error. This procedure resets certain machine indicators. Therefore, the records written on the Core Image file may not reflect the exact status of core storage at the time the COMPUTER RESET key was pressed.

$20: This message requests the Transitional Monitor to notify the operator when it can accept class B messages. This message can be entered *at any time.* The notification is given after the next EXEQ or JOB card is read.

$3x any input wanted: This message is used to provide console input to a dependent program. It is to be used only in accordance with instructions from the program or the person responsible for the program. "x" can be any valid character and varies according to the particular program and condition within the program. Additional input can follow the "x." The maximum length for messages entered from the console is specified at System Generation; the maximum length that can be specified is 20 (including the $3x). In the Storage Print, Tape Print, and Disk Print programs, the message is used for interrupting and terminating a single execution of the program. In this case, "x" can be any valid character but a blank.

$50: This message causes the Resident Monitor to exit from its Wait-Loop routine and return control to the dependent program. This message can be entered at any time the dependent program indicates that it is using the Wait-Loop routine.

$60: This message causes the immediate termination of the Snapshot being taken. Snapshot restores the index registers which it has used and returns to the calling program.

$70: This message signals the Resident Monitor to initiate immediate restart procedures. (See the "Restarting from a Checkpoint" section.)

$8x: This message, which has three forms (x = A, R, or C), is given by the operator in reply to a message from the Resident IOCS. The three forms and their uses are explained with the IOCS messages 20101, 30101, 30102. (See the "Console Messages from IBM Programs" section.)

$90b any input wanted: This message is used to communicate information to the Tele-processing system. Such information can be up to 20 characters in total length (including the four characters, $ 9 zero blank) and can be entered *at any time.* (Messages for the user's Executive can be accepted even when the TP complex is not open.) Messages for the Supervisor are $90bAOPEN and $90bACLOSE, which, respectively, open and close the TP complex. Messages for the Executive are established by the installation; they must not contain the character "A" in the fifth position.

Class B Messages

Class B messages can be accepted only after the ENTER B MESSAGES console message appears on the console. This message is issued by the Transitional Monitor and can appear only between jobs or between runs within a job. The message is written each time a Monitor END card is read from the Standard (or Alternate) Input Unit. It is also written if the operator has previously entered the $20 class A console inquiry; in this case, the message is issued when the next EXEQ or JOB card is read. After issuing the message, the Transitional Monitor enters a waiting loop to await instructions from the console. In addition to class B messages, class A messages can be entered at this time.

$B1: This message causes the Read routine of the Resident Monitor to be altered to read from the Alternate Input Unit. This message can be given only if the $20 message has been previously entered or if a Monitor END card has just been read from the *Alternate Input Unit.* (It cannot be given if the Transitional Monitor is in a waiting loop immediately following the detection of a Monitor END card from the *Standard Input Unit,* or when an EXEQ card has been read from SIU or AIU, regardless of whether or not the $20 message was given.)

$B2: This message causes the Transitional Monitor to close, rewind, and unload the Standard Print Unit tape. If this message is entered after an EXEQ card has been read, an INV B INQ message will be typed on the console. The operator then mounts another tape on that unit.

$B3: This message causes the Transitional Monitor to close, rewind, and unload the Standard Punch Unit tape. If this message is entered after an EXEQ card has been read, an INV B INQ message will be typed on the console. The operator then mounts another tape on that unit. (This message is used only if the Standard Punch Unit is not assigned to the same tape as the Standard Print Unit. If the two are assigned to the same tape, then the $B2 message is used to perform the closing function.)

$B4: This message causes the Transitional Monitor to close, rewind, and unload the Core Image file tape. This file contains records of core storage used for restarting from checkpoints or for obtaining storage prints. If this message is entered after an EXEQ card has been read, an INV B INQ message will be typed on the console. The operator then mounts another tape on the unit used for this file. (This message is applicable only if the Core Image file, which is optional, has been specified for the installation at System Generation.)

$B5ss: This five-character message indicates to the Transitional Monitor that the physical unit represented by assignment symbol "ss" is currently unavailable for use. (See the "Assignment of Input/Output Units" section for information on assignment symbols.)

$B6ss: This five-character message indicates to the Transitional Monitor that the physical unit represented by assignment symbol "ss" is now available for use. The Transitional Monitor removes the *unavailable* indication it had set in response to a $B5ss message for this physical unit.

$B7: This message is described in detail in the section "Use of SPOOL."

$Bcvwxyz: This message indicates that the operator can disconnect, direct, or change the assignment of the 1311 disk drives on a specific channel. The letter c represents a channel number. If c is replaced with A, channel 1 is specified; if it is replaced with B, channel 2 is specified. The letters vwxyz represent the drive numbers for the disk drives that are on the channel. The number 0, 1, 2, 3, or 4 is placed in the position occupied by v, w, x, y, or z, respectively. The number entered in the v, w, x, y, or z position represents the disk drive number to which input/output operations are directed by the program. If a drive is to be disconnected, the corresponding position is left blank.

$BX: This message indicates that the operator has no more class B messages at this time. It causes the Transitional Monitor to exit from the waiting loop it had entered to allow the operator to make console inquiries. After performing the functions indicated by each of the *other* class B messages, the Transitional Monitor returns to the waiting loop for further mes-

sages. Therefore, the $BX must be given to enable the Transitional Monitor to resume its processing.

After the $BX message is entered, the Transitional Monitor completes functions related to previous class B messages. For example, the complete procedure for use of a $B2 message is:

1. The Transitional Monitor types out ENTER B MESSAGES to notify the operator it is ready to accept class B messages, and then enters a waiting loop.
2. The operator presses INQUIRY REQUEST.
3. The operator enters the $B2 message.
4. The operator presses INQUIRY RELEASE.
5. The Transitional Monitor performs the closing functions for the Standard Print Unit and returns to the waiting loop.
6. The operator mounts another tape for the Standard Print Unit.
7. The operator presses INQUIRY REQUEST.
8. The operator enters the $BX message.
9. The operator presses INQUIRY RELEASE.
10. The Transitional Monitor opens the file for the new tape and resumes other processing related to preparation for the next job.

When the waiting loop (entered as a result of a Monitor END card or a $20 message) is terminated by the $BX message, the Read routine of the Resident Monitor is set to read from the Standard Input Unit. The Transitional Monitor resumes reading and processing from the Standard Input Unit without initialization. Therefore, it will ignore any daily information, such as a DATE card, and will skip to the next JOB card. (See the "Initialization and Reinitialization" and "Control Card Formats" sections.)

Closing System Files

The Standard Print Unit, Standard Punch Unit, and Core Image file should be closed from the console by the $B2, $B3, and/or $B4 messages, rather than permitted to run to end of reel.

Closing from the console ensures that a related series of records (such as a compilation listing) is not split between two reels of tape. Failure to close the Standard Print and/or Punch Unit from the console complicates tape handling because a copy of the POW program (described in the "Use of POW" section) is written on the Standard Print and/or Punch Units only when the units are opened. Because opening occurs only during initialization of the Monitor and after each close order from the console, closing from the console enables the POW program to be written on each reel of tape.

A similar consideration applies to the Core Image file. Certain control records, necessary for execution of the Storage Print program, are written at the beginning of the tape only when this file is opened. (Opening also occurs only during Initialization and after each $B4 close order sent from the console.) If the records of a checkpoint are split between two reels of the Core Image file, a restart cannot be made from that checkpoint. That is, failure to close the Core Image file from the console will make restarting from a checkpoint impossible. Also, if EOR occurs during writing of checkpoint records, subsequent checkpoint records will be invalid. Therefore, the core image file must not be allowed to run to END OF REEL. (See the "Restarting from a Checkpoint" section.)

Class C Messages

The following message is given in reply to a message from the Transitional Monitor. The message from the Transitional Monitor, 20502 SUB FOR ss, notifies the operator that an ASGN card specified an assignment symbol "ss" for a physical unit that is currently unavailable (as indicated by a previous $B5ss message).

$C1ss: This message specifies that the assignment symbol "ss" is to be substituted for the one contained in the ASGN card. The substituted physical unit must be currently available. The $B6ss message cannot be used at this time to indicate that the unit specified on the ASGN card is now available; it must have been given before the ASGN card was read.

Class D Messages

See "Operator Action" in the "Initialization Messages" topic of the "Console Messages from IBM Programs" section.

The SPOOL (Simultaneous Peripheral Operation On Line) capability permits card-to-tape, tape-to-card, and tape-to-printer operations to be carried on at any time. If a batch program is also being executed, the total running time for the batch and SPOOL programs is signifieantly less than the time that would be required to accomplish the same operations serially.

SPOOL continues operation regardless of the other functions performed by the Operating System.

Initialization of the SPOOL Inquiries

To begin SPOOL the operator must first assign the SPOOL input/output units. The operator enters two physical units; one must be a unit-record device and the other a tape unit. If applicable, he must also indicate the name of the user-written editing routine to be loaded. He does this by using a B-type console inquiry or a SPOOL card (see "Control Card Formats"). There are seven valid SPOOL messages:

1. $B7bxxyyb
2. $B7Uxxyyb
3. $B7Bxxyyb
4. $B7bxxyynnnnnnnnnnb
5. $B7Uxxyynnnnnnnnnnb
6. $B7Bxxyynnnnnnnnnnb
7. $B7Rxxyy

If a batch program is being executed, the operator must first press INQUIRY REQUEST, enter $20, and press INQUIRY RELEASE; this causes the Transitional Monitor to indicate to the operator when to enter the B-type message.

$B7bxxyyb: This message is used to assign physical units xx and yy as SPOOL units and to indicate that no user-written editing routine is to be loaded. The physical-unit designations are preceded and followed by a blank character, as indicated. If a tape is to be read, the SPOOL routine reads the tape in odd parity. If a tape is to be written, the SPOOL routine writes the tape in odd parity.

NOTE: Any previous SPOOL physical units on this channel are automatically made available to the system.

$B7Uxxyyb: This message has the same effect as $B7bxxyyb, except that a tape is read or written in even parity.

$B7Bxxyyb: This message has the same effect as $B7bxxyyb.

$B7bxxyynnnnnnnnnnb: This message assigns physical units xx and yy as SPOOL units and causes the user-written editing routine "nnnnnnnnnn" to be loaded from the SOF into the area reserved in Resident Monitor. The physical unit and editing information is preceded and followed by a blank character, as indicated. If a tape is to be read, the SPOOL routine reads the tape in odd parity. If a tape is to be written, the SPOOL routine writes the tape in odd parity.

NOTE: Any previous SPOOL physical units on this channel are automatically made available to the system.

$B7Uxxyynnnnnnnnnnb: This message has the same effect as $B7bxxyynnnnnnnnnnb, except that a tape is read or written in even parity.

$B7Bxxyynnnnnnnnnnb: This message has the same effect as $B7bxxyynnnnnnnnnnb.

$B7Rxxyy: This message indicates that SPOOL operations are to be terminated and that physical units xx and yy are to be released from their assignment as SPOOL units and made available for any desired function.

After initialization of SPOOL, the only way the parity specification can be changed is through reinitialization.

Initiation of SPOOL Operation

After the SPOOL operation has been initialized with the appropriate B-type message, the SPOOL operation must be initiated. The following steps, performed by the operator at any time following Initialization, will initiate the SPOOL operation.

1. Ready the appropriate tape on the SPOOL tape unit.
2. Ready the appropriate Unit-Record Device.
3. Turn the Priority Select Switch on the console printer to the appropriate setting.
4. Press PRIORITY ON.

SPOOL may be temporarily suspended at any time by pressing PRIORITY ON. Press again to resume SPOOL.

SPOOL operation will continue until End of Job. When this occurs, an EOS message is issued.

Use of POW

POW (Peripheral Output Writer) is an IBM 1401 program that can print and/or punch, under sense-switch control, the contents of tapes used as the Standard Print Unit and Standard Punch Unit. (For purposes of this section, reference to these units assumes that they are tape.)

Use of POW requires the following minimum machine configuration:

4,000 positions of core storage
Sense switches
Advanced programming features
High-Low-Equal Compare feature
1 Magnetic tape unit (2 for processing separate Standard Print and Punch Units concurrently)
1403 Printer, Model 2, for records from the Standard Print Unit
1402 Card Read Punch, Model 1, for records from the Standard Punch Unit

NOTE: The 1401 must also have the Read Punch 2-8 Card Code A-bit compatibility feature. Without this feature, the substitute blank (or cent sign) is punched as a zero.

Inclusion of POW in the Operating System is a System Generation option. The inclusion of the module IBPOWTRAN as part of the Transitional Monitor provides facilities for the Transitional Monitor to write a copy of POW on the Standard Print Unit and Standard Punch Unit each time either of the units is opened. These units are opened during Initialization or reinitialization of the System Monitor and each time the $B2 or $B3 console inquiry is accepted by the Transitional Monitor. Note that POW is *not* written at the beginning of a tape when the previous tape was ended as the result of a physical end of reel. Therefore, the Standard Print and Punch Unit tape(s) should be closed from the console before end of reel.

The copy of POW is written immediately preceding the first data record on the tape. For installations not using labels on the System files, POW is the first record on the tape; for installations using labels, POW is preceded by the header label and a tape mark (120-character labels) or by the header label only (80-character labels). Figure 10 illustrates the three possible formats.

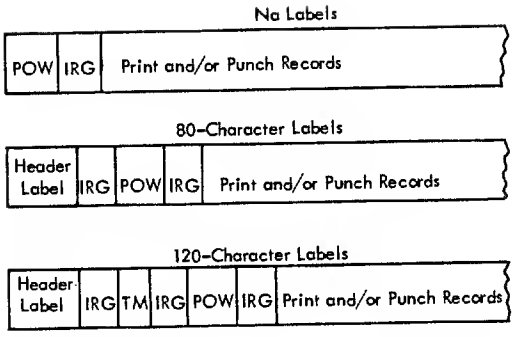


Figure 10. Formats for Tapes Containing POW

Operating Instructions

Sense Switch Control

Set Switch E ON for labeled tapes, OFF for unlabeled tapes. Switches B and C control the type of run, as shown in Figure 11.

The I/O Check Stop switch should be ON for error detection in the printed and punched output when the POW program is run on an IBM 1410 or 7010 System in the 1401 mode.

Tape Unit 1	Tape Unit 2	Switch B	Switch C
Print only *	-----	ON	OFF
Punch only **	-----	OFF	ON
Print/Punch	-----	OFF	OFF
Print only *	Punch only **	ON	ON

* Punch records, if any, are ignored.
** Print records, if any, are ignored.

Figure 11. Sense Switch Control for POW

Beginning-the-Run Procedures

To process unlabeled tapes, perform the following:

1. Ready tape unit(s) and set sense switches.
2. Press CHECK RESET and START RESET, then TAPE LOAD.

To process tapes containing 80-character labels, perform the following:

1. Ready tape unit(s) and set sense switches.

2. Press CHECK RESET and START RESET, then TAPE LOAD (to read past the header label).

3. Press CHECK RESET and START RESET, then TAPE LOAD (to load POW).

To process tapes containing 120-character labels, preform the following:

1. Ready tape unit(s) and set sense switches.

2. Press CHECK RESET and START RESET, then TAPE LOAD (to read past the header label).

3. Press CHECK RESET and START RESET, then TAPE LOAD (to read past the tape mark).

4. Press CHECK RESET and START RESET, then TAPE LOAD (to load POW).

Steps for Processing Additional Reels

Runs Involving One Tape Unit

When POW encounters the first tape mark following the data records, it issues a Rewind and Unload instruction for the tape unit, and then halts. To continue processing, perform the following:

1. Reset the sense switches, if the next processing is different from that just completed. (It is permissible to change to two-unit processing.)

2. Ready the tape unit(s). (If the run is continued by dialing the Tape Address Selector Switch on another tape unit to "1" while the just-processed tape is still rewinding, dial the rewinding unit to "blank" before performing the next step.)

3. Press START.

Runs Involving Two Tape Units

When POW encounters the first tape mark following the data records on either of the units, it issues a Rewind and Unload instruction for that unit and continues processing the other unit. To continue processing *the same type of records* as those on the unit just completed, proceed as follows:

1. Ready the tape unit. (If the new reel is to be processed by dialing the Tape Address Selector Switch on another tape unit to "1" or "2" while the just-processed tape is still rewinding, dial the rewinding unit to "blank" before performing the next step.)

2. Toggle the sense switch (by setting it OFF, then ON) that controls processing for the new reel. (Switch B for print records on unit 1; Switch C for punch records on unit 2.)

POW halts when it finishes processing one of the units and finds that the other unit does not have a tape ready for processing. (That is, the sense switch for the other unit has not been toggled.) If more tapes are to be processed, the run can be continued under the same sense-switch control, or it can be continued (as a one-unit run) under different sense-switch control. To continue the run, proceed as described in "Runs Involving One Tape Unit."

Error Conditions

If POW is unable to correct a read error on an input record, it prints the record as it was read into core storage, and then prints an error message immediately below the record containing the error.

If POW is unable to correct a read error on an input punch record, it punches the record and selects it into the 4 pocket. (Cards are normally selected into the 8/2 pocket.)

If an error occurs in the printed or punched output, the computer will halt if the I/O Check Stop switch is ON. If this occurs, the POW program should be re-executed.

Operating Tips

Once POW is loaded by the procedure described in "Beginning-the-Run Procedures," the program punches all 80-character records and prints all 133-character records read from the input tape. All other records except the tape mark following the 80- or 133-character records are bypassed. This bypassing occurs on the tape being processed and all subsequent tapes providing input for the POW run. For example, header labels, tape marks, and copies of POW that precede data records on a subsequent tape for the POW run are bypassed.

Check to ensure that a copy of POW is on the first tape from unit 1. (Duplicate copies on subsequent reels are automatically bypassed by the program.) It is suggested that all tapes used for the Standard Print Unit and Standard Punch Unit be given an external label to indicate whether they contain a copy of POW. This should be done when the tape is taken from the 1410 or 7010 System.

Run out the cards remaining in the punch stations after processing is completed for each group of punch records.

If the only tape to be processed by POW does not contain a copy of the program, POW can be loaded from a previously processed tape, using the procedure described under "Beginning-the-Run Procedures." By leaving the Printer and/or Punch out of Ready, the user can effect the loading but not execution of the POW program. Then, to process the tape, the Printer and/or Punch should be made Ready, and the tape made Ready on unit 1.

Restarting from a Checkpoint

Checkpoint records are written on the Core Image file at the request of a dependent program. From these records, which are an image of core storage as it appeared at the time of the checkpoint, the dependent program can be restarted should execution of the program be temporarily discontinued. (Information on requests for checkpoints is in the publication *IBM 1410/7010 Operating System; Basic Input/Output Control System,* Form C28-0322.)

The System Monitor provides two types of restart facilities, *immediate* and *delayed.* The two types perform the same functions for repositioning tapes, restoring machine indicators, and resuming program execution; the difference lies in the operating procedures used to initiate the restart.

Immediate Restart

An immediate restart is initiated by the $70 console inquiry. Each time this inquiry is entered by the operator, the Monitor loads the Restart routine, which reads the Core Image file to find *the most recent checkpoint.* From this checkpoint, the Restart routine reconstructs the machine status and program status that existed at the time the checkpoint was taken. Control is then given to the dependent program to resume execution.

Delayed Restart

A delayed restart is performed through use of initialization procedures (which are described in the Initialization and Reinitialization" section). Entering the initialization status character "D" in location 00000 informs the Initialization routine that a restart is to be performed. The Initialization routine requests by the message ENTER RST NUMBER that the operator enter the number of checkpoint to be used for the restart.

The operator can enter the four-character identification of any checkpoint that is on the currently assigned Core Image file. (Press INQUIRY REQUEST; type the three-character identification on the console printer; press INQUIRY RELEASE.) The Initialization routine then causes the Restart routine to be loaded. The Restart routine locates the specified checkpoint on the Core Image file, performs its reconstruction functions, and gives control to the program being restarted.

For a delayed restart, the machine must be set up identically to the setup at the time the checkpoint was taken. That is, all tapes, including those for the Tele-processing system, must be mounted on the same physical units. The same restriction is also true for an immediate restart, but generally it requires no operator action.

The Restart routine will reposition all tapes for the batch, except as noted in the *System Monitor* and *Basic Input/Output Control System* publications.

Operating Considerations

The Standard Print and Punch Units, *if assigned to the same tape unit,* are not repositioned during a restart. If the variable print and punch modules have been selected during System Generation, and the Standard Print Unit, Standard Punch Unit, and Core Image file are on the same tape unit, that tape unit will be repositioned to a point just beyond the checkpoint taken.

If the user's System Operating File is on tape and the Standard Input Unit is a card reader, a delayed restart requires that the first cards in the hopper be either:

1. Those cards to be read by the restarted program (if that program uses the SIU for input); or
2. Those cards following the first Monitor control card to be read after the restarted program completes its processing (if that program does *not* use the SIU for input). For example, the first Monitor control card could be a JOB card to begin a new job. When the System Operating File is on disk, the first cards described above should be proceded by the Bootstrap 1 routine card.

The $20 console inquiry (requesting notification of the time to enter class B messages) can be used any time during the restart procedures or during execution of the restarted program. This inquiry is useful for a delayed restart with a tape Standard Input Unit. If, for example, the restart uses a tape Standard Input Unit from a previous batch, the $20 inquiry makes it possible to return to the current Standard Input Unit when the restarted job is completed. (The return would be effected by reinitialization procedures.)

Tape-Oriented System

To generate a System Generator file from the IBM-supplied Master file, use the procedures in Table I, in the "Initialization and Reinitialization" section, with the following changes:

1. Where the instructions say "System Operating File," regard them as saying "Master file."
2. The IBM-provided Master file does not have a label.
3. Four tape Work files are required.
4. Enter control cards through the Standard Input Unit. If the Standard Input Unit is not a card reader on channel 1, put a word mark over the status character entered into location 00000. Enter the assignment for the Standard Input Unit when the message ENTER SOF/SIU ASGN SYMB appears on the console printer: enter yyxx, where "yy" is the assignment symbol for the Master file and "xx" is the assignment symbol for the Standard Input Unit (tape unit, or card reader on channel 2). If the Standard Input Unit is a card reader on channel 2, "xx" must be R2.
5. The System Generator file will be produced on the Work file MW2.

Repeat the above procedure to generate a System Operating File from the System Generator file. Use the System Generator file in place of the Master file. (The System Generator file may or may not have a label, at the option of the installation.) The System Operating File will be produced on Work file MW2.

Disk-Oriented System

To generate a System Generator file from the IBM-supplied Master file tape, first load the Master file contents onto disk, using the System Generator Disk Loader program (see "Disk Loader Programs"). Then use the procedures in Table II in the "Initialization and Reinitialization" section, with the following changes:

1. Where the instructions say "System Operating File," regard them as saying "Master file."
2. Four disk Work files are required.
3. Enter control cards through the Standard Input Unit. If the Standard Input Unit is not a card reader on channel 1, put a word mark over the status character entered into location 00000. Enter the assignment for the Standard Input Unit when the message ENTER SOF/SIU ASGN SYMB appears on the console printer: enter "yyxx", where "yy" is the assignment symbol for the Master file and "xx" is the assignment symbol for the Standard Input Unit (tape unit, or card reader on channel 2). If the Standard Input Unit is a card reader on channel 2, "xx" must be R2.
4. The tape for the System Generator file will be produced on the Work file MW2.

Repeat the above procedure, including loading the System Generator file onto disk, to generate a System Operating File from the tape for the System Generator file. Use the System Generator file tape in place of the Master file tape. The tape for the System Operating File will be produced on the Work file MW2.

Load the contents of the tape for the System Operating File onto disk, using the System Generator Disk Loader program.

Disk Loader Programs

The System Generator Disk Loader program loads the contents of the disk System tape and/or Library onto the disk areas specified by the installation. The disk System tape is a tape containing one of the following: the disk-oriented Master file supplied by IBM; a System Generator file; or a System Operating File. "Library" is a disk library produced by System Generation. The Library can be on the System tape reel or on a separate reel.

The System Generator Disk Loader program can load three different configurations of the tapes:

1. (Master file, SGF, or SOF) and Library on the same reel.
2. (Master file, SGF, or SOF) only.
3. (Master file, SGF, or SOF) on one reel; Library on another reel.

The Disk Library Loader program loads the contents of the Library tape (Library on a separate reel) onto the disk area specified by the installation.

System Generator Disk Loader Program Operating Instructions

The System Generator Disk Loader program must be the first program on the tape being loaded. If both a System tape and a Library tape are being loaded, the program needs to be first on only the System tape. If only a Library tape is being loaded, and the tape does not contain the System Generator Disk Loader program, the Disk Library Loader program (see below) should be used.

To load a System tape that contains either the Master file, SGF, or SOF only, to load a System tape that contains the Master file, SGF, or SOF *and* the Library, perform the following:

1. Mount the tape on a unit on channel 1 or channel 2.
2. Alter 00000 to bLyBz00012$N, where
   "y" is the channel, and
   "z" is the number of the tape unit.
3. Press COMPUTER RESET and START.
4. Comply with the console messages.

If the System tape contains only the Master file, SGF, or SOF, and the library is on a separate reel, perform the following to load the tapes:

1. Mount the Library tape on channel and unit 10 or 20.
2. Mount the System tape on any other tape unit.
3. Alter 00000 to A if the Library tape is on channel 10; alter 00000 to B if the Library tape is on 20. If the Library tape has a label, place a word mark over the character at 00000.
4. Alter 00001 to LyBz00012$N, where
   "y" is the channel, and
   "z" is the number of the tape unit.
5. Press COMPUTER RESET and START.
6. Comply with the console messages.

Use of the IBM 7010 Load Key: The procedures above can be used on both the 1410 and the 7010. On the 7010, the Load key can be used instead of entering the read instruction into locations 00000-00011. The System tape must be mounted on channel and unit 10. If a separate Library tape is also being loaded, it must be mounted on channel and unit 20, and location 00000 must be altered to "B". (Place a word mark over the "B" if the Library tape has a label.)

If the System tape has an 80-character label, press the Load key twice; if it has a 120-character label, press it three times.

Disk Library Loader Program Operating Instructions

Place the Library tape on the physical unit assigned as /MW1/. Assign the disk area to be loaded as LIB.

The Monitor control card EXEQ DSKLIBLDR will cause the Disk Library Loader program to be executed.

This section contains formats and examples of all control cards used for the IBM-provided programs within the Operating System. Detailed explanations of the various parameters that can be entered in these cards are provided in the publications describing the individual programs. Descriptions of any macro statements used can also be found in these publications.

In the control-card formats shown, a number, capital letter, or special character (e.g., 5, H, or $) indicates that if the parameter is used, this must be the entry made for that position. A lower-case letter (e.g., n, xxx) indicates that the letter(s), number(s), or special character(s) for this position(s) is variable; the possible entries are indicated in the text. A lower-case "b" signifies a blank character, except when the letter is part of a mnemonic (e.g., the "b" in "linksymbol" and "libname" does not indicate a blank character). Lower-case letters in parentheses appear in the form of English-language words. This method is used in cases where a wide range of entries can be made; the nature of the entries is further described in the text.

Monitor Control Cards

There are ten types of Monitor control cards: ASGN, COMT, DATE, SPOOL, EXEQ, END, JOB, MODE, PAUSE, and TP.

Several options are available, at System Generation, for recording Monitor control cards as they are read by the System Monitor. The installation can elect to have all Monitor control cards typed on the console printer, written on the Standard Print Unit, punched on the Standard Punch Unit, or recorded by any combination of the type-punch-write options.

All JOB and COMT cards are typed on the console typewriter whether or not the typing option is elected for other Monitor Control cards. Similarly, JOB and COMT cards are always written on the Standard Print Unit, if the installation includes that unit in its specified configuration.

ASGN Card

ASGN cards are used during Initialization and throughout the batch to specify particular input/output units to be used by the System Monitor and by programs operating under the Monitor's control. The "Assignment of Input/Output Units" section contains further information on these cards. In Figure 12, the first three lines are examples of ASGN card formats; "xxx", "yyy", and "zzz" are the names of symbolic units that can be assigned during Initialization or throughout the processing of batch (see "Assignment Times for Symbolic Units"). "ss" is the assignment symbol for a base physical unit, and "aa" the assignment symbol for an alternate physical unit. Lines 4, 5, and 6 are examples of the formats shown in lines 1, 2, and 3, respectively.

Line	Label	Operation	
0.1	MON$$.	ASGN	x.x.x.,s.s.,a.a.
0.2	MON$$.	ASGN	y.y.y.,z.z.z.
0.3	MON$$.	ASGN	u.u.u.
0.4	MON$$.	ASGN	MR1.,A1.,A2.
0.5	MON$$.	ASGN	MW2.,MR2.
0.6	MON$$.	ASGN	MW3
0.7			

• Figure 12. ASGN Card Formats and Examples

COMT Card

COMT cards are used to print or type information for programmers and operators. The contents of columns 21 through 72 are written on the console typewriter and Standard Print Unit regardless of the Monitor card recording option specified. Figure 13 shows the format for the COMT card, and an example.

Line	Label	Operation	OPERAND
0.1	MON$$.	COMT	(message)
0.2	MON$$.	COMT	THIS JOB CONSISTS OF PROGRAMS STEVEN AND ALAN
0.3			

• Figure 13. COMT Card Format and Example

DATE Card

The DATE card is one of the Initialization cards. Line 1 of Figure 14 shows the format of the card. "yy" is the last two digits in the year, and "ddd" is the number of the day in the year. Line 2 shows an example of this card.

Line	Label	Operation	21 25 30 35 40
0 1	M.O.N.$.$.	D.A.T.E.	y.y.d.d.d.
0 2	M.O.N.$.$.	D.A.T.E.	6.4.3.6.6.
0 3			

• Figure 14. DATE Card Format and Example

SPOOL Card

The SPOOL card, if used, should precede the JOB card at Initialization. The formats of this card are shown in lines 1 through 6 of Figure 15. Line 1 shows the format of a SPOOL card for an operation with no editing routine (Type I SPOOL). "xx" and "yy" are the physical units involved in the SPOOL operation. The first "xx" must be a unit record device, and the second "yy" a tape unit. The tape is read or written in odd parity. Line 2 shows the format of a SPOOL card for an operation with an editing routine (Types II and III SPOOL).

Line	Label	Operation	21 25 30 35 40
0 1	M.O.N.$.$.	S.P.O.O.L	x.x.y.y.
0 2	M.O.N.$.$.	S.P.O.O.L	x.x.y.y.n.n.n.n.n.n.n.n.n.
0 3	M.O.N.$.$.	S.P.O.O.U	x.x.y.y.
0 4	M.O.N.$.$.	S.P.O.O.B	x.x.y.y.
0 5	M.O.N.$.$.	S.P.O.O.U	x.x.y.y.n.n.n.n.n.n.n.n.n.
0 6	M.O.N.$.$.	S.P.O.O.B	x.x.y.y.n.n.n.n.n.n.n.n.n.
0 7	M.O.N.$.$.	S.P.O.O.L	A.3.B.2.
0 8	M.O.N.$.$.	S.P.O.O.L	A.3.B.2.E.D.I.T.S.P.O.O.L.
0 9	M.O.N.$.$.	S.P.O.O.U	A.3.B.2.E.D.I.T.S.P.O.O.L.
1 0			

• Figure 15. SPOOL Card Formats and Examples

"nnnnnnnnnn" is the name of the editing routine. The tape is read or written in odd parity. The format shown in line 3 has the same effect as that shown in line 1, except the tape is read or written in even parity. The format shown in line 4 has the same effect as that shown in line 1. The line 5 format has the same effect as that shown in line 2, except the tape is read or written in even parity. The format shown in line 6 has the same effect as that shown in line 2. Lines 7, 8, and 9 are examples of the SPOOL card. Formats shown in lines 1 through 6 perform the same function as the $B7bxxyyb, $B7bxxyynnnnnnnnnnb, $B7Uxxyyb, $B7Bxxyyb, $B7Uxxyynnnnnnnnnnb, and $B7Bxxyynnnnnnnnnnb console messages, respectively.

EXEQ Card

The EXEQ card informs the Monitor that the program named in the first operand is to be located, loaded, and then given processing control. Figure 16 illustrates the EXEQ card formats. "progmname" is the program to be located, loaded, and given control; it must always be the first operand. The second operand, "xxx", can be SOF or MJB, for the System Operating File or Job file, respectively; if this operand is omitted, the System Operating File is assumed as the location of "progmname." The third operand, "yyy", is the name of the symbolic unit containing the input data, source statements, or control cards for "progmname." This operand is optional; if omitted, the unit containing the EXEQ card is assumed. The second and third operands can be considered system-control paramcters. If one of these operands is omitted, it must be represented by a comma; however, no commas are required following the last specified operand. "optional" stands for any operands that the programmer can specify to provide information for the program named in the first operand. These optional operands can be considered program-control parameters. The formats of the EXEQ cards for the programs that can use these program-control operands are described below in the "EXEQ Card Program-Control Operands for IBM-Supplied Programs" section.

Lines 2 through 5 of Figure 16 show some examples of EXEQ card formats. Line 2 is an EXEQ FORTRAN card with all system-control and program-control operands entered. The card shown on line 3 performs the same function as the card on line 2. Line 4 shows a card that utilizes all possible assumed parameters. Note that since FORTRAN is the last (and only) operand, subsequent omitted operands do not have to be represented by commas. Line 5 shows the EXEQ card for a program on the Job file.

Line	Label	Operation	OPERAND 21 25 30 35 40 45 50 55 60 65 70
0 1	M.O.N.$.$.	E.X.E.Q	p.r.o.g.m.n.a.m.e.,.x.x.x.,.y.y.y.,.o.p.t.i.o.n.a.l.
0 2	M.O.N.$.$.	E.X.E.Q	F.O.R.T.R.A.N.,.S.O.F.,.S.I.U.,.7.,.1.2.,.P.C.H.,.F.L.T.,.N.A.M.E.X.
0 3	M.O.N.$.$.	E.X.E.Q	F.O.R.T.R.A.N.,.,.,.7.,.1.2.,.P.C.H.,.F.L.T.,.N.A.M.E.X.
0 4	M.O.N.$.$.	E.X.E.Q	F.O.R.T.R.A.N.
0 5	M.O.N.$.$.	E.X.E.Q	S.O.R.T.D.E.F.I.N.E.,.M.J.B.
0 6			

• Figure 16. EXEQ Card Format and Examples

EXEQ Cards Not Using Optional Program-Control Operands

Figure 17 shows MON$$ EXEQ cards for IBM-supplied programs that do not utilize the optional program-control parameters.

Line	Label	Operation	
01	MON$$	EXEQ	UTILITIES
02	MON$$	EXEQ	LABEL,1311
03			
04	MON$$	EXEQ	SORTDEFINE,MJB
05	MON$$	EXEQ	DSRTDEFINE
06			
07	MON$$	EXEQ	DEFINE,MJB
08			
09	MON$$	EXEQ	TPADLIBGEN
10	MON$$	EXEQ	TPATLIBGEN
11			
12	MON$$	EXEQ	SG4
13			
14	MON$$	EXEQ	DSKLIBLDR
15			

• Figure 17. Sample EXEQ Cards for IBM-Provided Programs Not Using Optional Program Control Operands

EXEQ Cards with Optional Program-Control Operands

Figures 18 through 26 show formats and examples of MON$$ EXEQ cards for which optional program-control operands can be specified. These EXEQ cards are: LINKLOAD, LINKLOADRT, LINKLOADRD, LINKLOADDT, LINKLOADTD, AUTOCODER, COBOL, FORTRAN, MACROPRT, SG1, SG2, SG3, and SG5.

In the case of the EXEQ AUTOCODER, COBOL, FORTRAN, SG1, SG2, SG3, and SG5 cards, the second operand (xxx) can be SOF or MJB. If this operand is omitted, SOF is assumed. For the EXEQ LINKLOAD, LINKLOADRT, LINKLOADRD, LINKLOADDT, LINKLOADTD, and MACROPRT cards, SOF must be specified or the operand omitted.

EXEQ LINKLOAD Card: Line 1 of Figure 18 illustrates the format of the EXEQ LINKLOAD card. The S in column 1 indicates that the Linkage Loader memory map should not be printed; if this letter is ommitted the memory map is printed. "yyy" is the symbolic unit containing the Linkage Loader control cards; if this operand is omitted, the unit containing the EXEQ card is assumed. "libname" can be a maximum of ten characters; it is the name of the library to be used. If this operand is omitted, and the system is tape-oriented, the Linkage Loader assumes that the library is the IBM Relocatable Library (IBMLIBR) If: (1) this operand is included; (2) the system is tape-oriented; and (3) no ASGN card for the library is present, the Linkage Loader assumes that the library named is on the System Operating File. In a disk-oriented system, the ASGN card for the library must be present; if the System Library file is on disk, the fourth parameter should be omitted. The fifth and sixth operands, also optional, are for chained programs (see *System Monitor*). "progrmname" is the name of the program that will include the chained subprograms, and COBOL must be specified if any of the subprograms were written in that language. Lines 2, 3, and 4 of Figure 18 show examples of the EXEQ LINKLOAD card.

NOTE: In System Generation for a disk-oriented system, only one EXEQ LINKLOAD card may be included per generation.

1	S	MON$$	EXEQ	LINKLOAD,SOF,yyy,libname,progrmname,COBOL
2		MON$$	EXEQ	LINKLOAD
3		MON$$	EXEQ	LINKLOAD,,,LIBRARY2,PROG3 CHAIN THIS PROGRAM
4		MON$$	EXEQ	LINKLOAD,,,PROG1,COBOL
5				
6	S	MON$$	EXEQ	LINKLOADRT,SOF,yyy,libname
7		MON$$	EXEQ	LINKLOADRT
8				
9	S	MON$$	EXEQ	LINKLOADRD,SOF,yyy,,zzzzzz
10		MON$$	EXEQ	LINKLOADRD,,,,BACKUP
11		MON$$	EXEQ	LINKLOADRD,,,,LOAD
12		MON$$	EXEQ	LINKLOADRD
13				
14	S	MON$$	EXEQ	LINKLOADDT,SOF,yyy,libname
15		MON$$	EXEQ	LINKLOADDT
16				
17	S	MON$$	EXEQ	LINKLOADTD,SOF,yyy,libname
18		MON$$	EXEQ	LINKLOADTD

• Figure 18. EXEQ LINKLOAD, LINKLOADRT, LINKLOADRD, LINKLOADDT, and LINKLOADTD Control Card and Examples

EXEQ LINKLOADRT Card: Line 6 of Figure 18 shows the format of the EXEQ LINKLOADRT card. This card is used in a tape-oriented system to generate a relocatable TP Library file on magnetic tape. The S in column 1, and the second, third, and fourth parameters in the operand field, perform the same functions as in the EXEQ LINKLOAD card. Line 7 is an example of the EXEQ LINKLOADRT card.

EXEQ LINKLOADRD Card: Line 9 of Figure 18 shows the format of the EXEQ LINKLOADRD card. This card is used in a disk-oriented system to generate a relocatable TP Library file on IBM 1301 or 2302 Disk Storage. The S in column 1, and the second and third parameters in the operand field, perform the same functions as in the EXEQ LINKLOAD card. The fourth parameter should be omitted. The fifth parameter (ZZZZZZ), if used, can be either BACKUP or LOAD. If BACKUP is specified, a special backup TP Library file, in relocatable format, is created on symbolic unit MW2; generation of this backup tape is concurrent with the creation of the relocatable TP Library file on symbolic disk unit MW3. The LOAD parameter is used to load a backup tape created from a previous execution of LINKLOADRD. The tape must be placed on symbolic tape unit MW2. Examples of the EXEQ LINKLOADRD card are shown in lines 10 through 12 of Figure 18.

EXEQ LINKLOADDT Card: Line 14 of Figure 18 shows the format of the EXEQ LINKLOADDT card. This card is required if a TP Library file in absolute format on magnetic tape is to be used with a disk-oriented system. The LINKLOADDT program creates a magnetic tape Job file; this Job file is then used in the generation of the absolute-format tape TP Library file for use with the disk-oriented system. The EXEQ TPATLIBGEN card must be used to generate the library. The S in column 1, and the second, third, and fourth parameters in the operand field, perform the same functions as in the EXEQ LINKLOAD card. Line 15 shows an example of the EXEQ LINKLOADDT card.

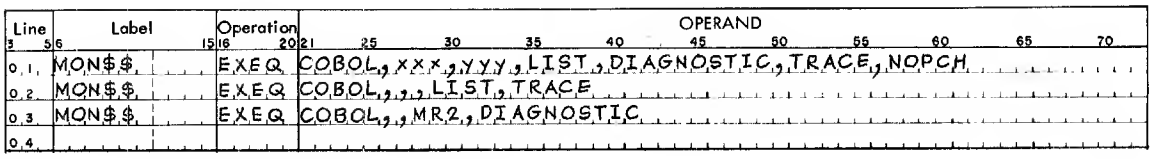
EXEQ LINKLOADTD Card: Line 17 of Figure 18 shows the format of the EXEQ LINKLOADTD card. This card is required if a TP Library file in absolute format on IBM 1301 or 2302 Disk Storage is to be used with a tape-oriented system. The LINKLOADTD program creates a 1301 or 2302 disk Job file; this Job file is then used in the generation of the absolute-format disk TP Library file for use with the tape-oriented system. The EXEQ TPADLIBGEN card must be used to generate the TP library. The S in column 1, and the second, third, and fourth parameters in the operand field, perform the same functions as in the EXEQ LINKLOAD card. Line 18 is an example of the EXEQ LINKLOADTD card.

EXEQ AUTOCODER Card: Figure 19 shows the format and examples of the EXEQ AUTOCODER card. Line 1 shows the format of the card. "yyy" is the symbolic unit containing the source statements. If this operand is omitted, the Monitor assumes that the source statements immediately follow the EXEQ card. The NOPRT, NOPCH, NOMAC, and NOFLG entries are optional parameters that signify suppress printing, suppress punching, no macros present, and suppress the "M" flag, respectively. These parameters can appear in any order; a comma need not be substituted if a NOPRT, NOPCH, NOMAC, or NOFLG paramter is omitted. The first blank in the operand field of the EXEQ card terminates the scan for parameters. Lines 2, 3, and 4 are examples of the EXEQ AUTOCODER card.

EXEQ COBOL Card: Figure 20 shows the format and examples of the EXEQ COBOL card. The format of the card is shown on line 1. "yyy" is the symbolic unit containing the source statements. If this operand is omitted, the Monitor assumes that the source statements immediately follow the EXEQ card. The remaining parameters are optional and can appear in any order. The LIST operand causes the generation of a listing of source program names and corresponding object-program relocatable core-storage assignments. DIAGNOSTIC suppresses the creation of an object program; this operand cannot be used if the TRACE or NOPCH operands appear on the card. TRACE causes the generation of a self-tracing object program; each paragraph or main body of the Procedure Division, when executed, is printed on the Standard Print Unit. NOPCH suppresses output on the Standard Punch Unit; this option should be used only when a Go file is being written. Any omitted parameters after the third in this card need not be represented by commas. Pa-

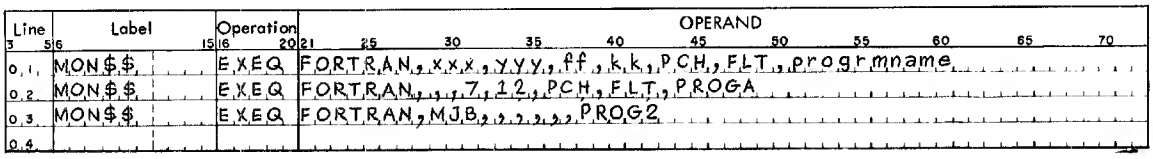
Line	Label	Operation	OPERAND
0.1	MON$$	EXEQ	AUTOCODER,XXX,YYY,NOPRT,NOPCH,NOMAC,NOFLG
0.2	MON$$	EXEQ	AUTOCODER
0.3	MON$$	EXEQ	AUTOCODER,,,,NOPRT,NOPCH
0.4	MON$$	EXEQ	AUTOCODER,,MW4,NOPRT,NOPCH,NOMAC
0.5			

• Figure 19. EXEQ AUTOCODER Card Format and Examples



Line	Label	Operation	OPERAND
0.1	MON$$	EXEQ	COBOL,xxx,yyy,LIST,DIAGNOSTIC,TRACE,NOPCH
0.2	MON$$	EXEQ	COBOL,,,,LIST,TRACE
0.3	MON$$	EXEQ	COBOL,,MR2,DIAGNOSTIC
0.4			

• Figure 20. EXEQ COBOL Card Format and Examples



Line	Label	Operation	OPERAND
0.1	MON$$	EXEQ	FORTRAN,xxx,yyy,ff,k,k,PCH,FLT,progrmname
0.2	MON$$	EXEQ	FORTRAN,,,,7,12,PCH,FLT,PROGA
0.3	MON$$	EXEQ	FORTRAN,MJB,,,,,,,PROG2
0.4			

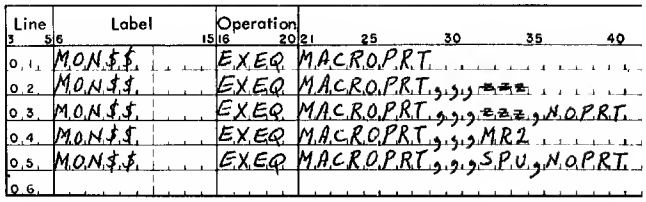
• Figure 21. EXEQ FORTRAN Card Format and Examples

rametcr analysis tcrminates with the first blank character in thc operand field. Examples of the EXEQ COBOL card are shown in lines 2 and 3 in Figure 20.

EXEQ FORTRAN Card: The format of the EXEQ FORTRAN card, and examples of the card, arc shown in Figure 21. Line 1 shows the format for the card. "yyy" is the symbolic unit containing the source statements. If this operand is omitted, the Monitor assumes that the source statements immediately follow the EXEQ card. Thc rcmaining parameters are optional; however, unlike the corresponding Autocoder and COBOL parameters, the FORTRAN operands must appear in the order shown in linc 1. "ff", indicating the real number precision desired, can bc any one- or two-digit number from 3 to 18; if this operand is omitted, 8 is assumed. "kk", the integer precision, can be any number from 3 to 20; if this operand is omitted, 5 is assumed. If PCH is specified, the proccssor writes the output on the Standard Punch Unit. If thc object program is to be run on an IBM 7010 with the Floating-Point Arithmetic special feature, FLT should bc specified; for other 7010 systems and all IBM 1410 systems, this operand must be omitted. "progrmname" is the one-to-ten character identification of a main program; if this operand is omitted, MAINPGM is assumed. Omitted parameters in thc EXEQ FORTRAN card must bc represented by commas; however, no commas arc required after the last specified parameter. Paramctcr analysis terminates with thc first blank in the operand field. Lines 2 and 3 are examples of the EXEQ FORTRAN card.

EXEQ MACROPRT Card: Figure 22 shows formats and examples of thc EXEQ MACROPRT card. This card, and onc or more PRINT cards, are required for the execution of the Macro Print and Punch program, which must be placed on the SOF during System Generation. At least one PRINT card (see "Macro Print and Punch Program Control Card") must immediately follow the EXEQ MACROPRT card.

Line 1 shows the EXEQ MACROPRT card used for printing the contents of the Macro Library. The presence of only the MACROPRT parameter indicates that the selected contents of the Macro Library, as indicated on the PRINT card(s), should be printed only. Thc contents are printcd on the SPR.

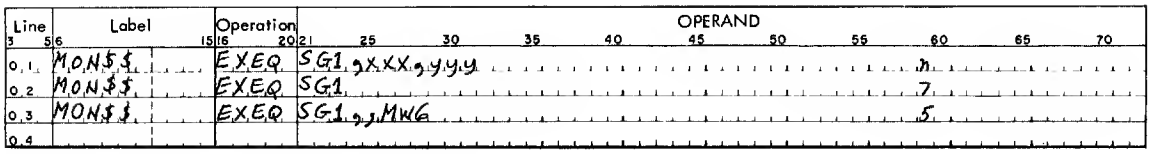


Line	Label	Operation	
0.1	MON$$	EXEQ	MACROPRT
0.2	MON$$	EXEQ	MACROPRT,,,zzz
0.3	MON$$	EXEQ	MACROPRT,,,zzz,NOPRT
0.4	MON$$	EXEQ	MACROPRT,,,MR2
0.5	MON$$	EXEQ	MACROPRT,,,SPU,NOPRT
0.6			

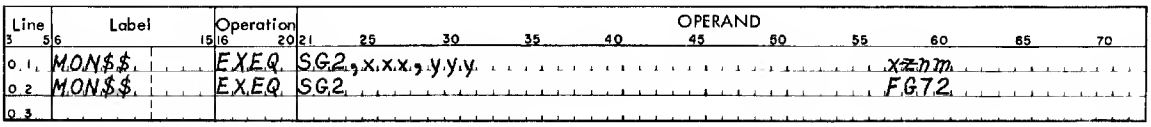
• Figure 22. EXEQ MACROPRT Card Formats and Examples

Line 2 shows the format of the EXEQ MACROPRT card used for printing and punching the selected contents of the Macro Library. "zzz" can be SPU, MRN, or MWN, and indicates the symbolic unit on which thc Macro Library contents should be punched or written. The contents are also printed on the SPR. Line 3 shows the format of the EXEQ MACROPRT card used for inhibiting the printing of the Macro Library. The parameter NOPRT causes the output to bc placed only on the symbolic unit specified in the "zzz" operand. Examplcs of these two formats are shown in lines 4 and 5, respectively.

EXEQ SG1 Card: Line 1 of Figure 23 shows the format of the EXEQ SG1 control eard. "yyy" is the symbolic input unit containing the SG control cards. If this operand is omitted, the Monitor assumes that the cards immediately follow the EXEQ card. The "n" in column 59 must be specified if the program is executed during System Generation. "n" can be either 3, 5, 7, or 9, for 40,000, 60,000, 80,000, or 100,000 positions of core storage, respectively. Examples of thc EXEQ SG1 card are shown in lines 2 and 3.



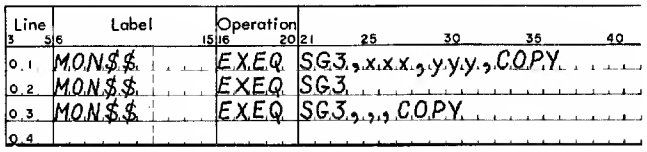
• Figure 23. EXEQ SG1 Card Format and Examples



• Figure 24. EXEQ SG2 Card Format and Example

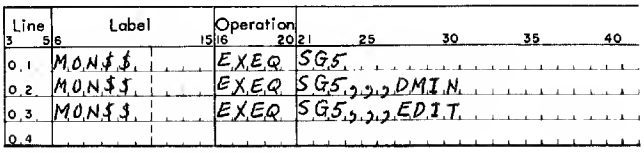
EXEQ SG2 Card: Line 1 of Figure 24 shows the format of the EXEQ SG2 control card. "yyy" performs the same function as described for the EXEQ SG1 card. "xzmn" is specified only if the program is executed during System Generation. If the system is tape-oriented, any character but a blank in column 57 indicates to the SG2 program that: (1) SG1 only updated an alternate relocatable library; and (2) the printed output of SG2 is to consist solely of names of the relocatable library modules. If the system is disk-oriented, and "x" is any character but a blank, the SG2 program prints only the names of the relocatable library modules. If "x" is a blank, the printed output for either a tape-oriented or disk-oriented system is a complete listing of the SOF (or SGF) generated. The "z" in column 58 can be any character. The presence of any character but a blank indicates to the SG2 program that the largest possible records are to be built. If this column contains a blank, the size of the records for absolute-format programs is 2,165 characters. This entry will override any specification given in the first Linkage Loader PHASE card for a program, and is not used if the system is disk-oriented. The "n" in column 59 performs the same function as specified for column 59 in the EXEQ SG1 card. The "y" in column 60 can be a 0, 1, or 2. Zero indicates that there are no tape labels; 1 indicates 80-character labels; and 2 indicates 120-character labels. If this column contains a 1 or 2, an SG2 Label Information card must follow (see "SG2 Control Cards"). An example of the EXEQ SG2 card is shown on line 2 of Figure 24.

EXEQ SG3 Card: Line 1 of Figure 25 shows the format of the EXEQ SG3 card. "yyy" performs the same function as described for the SG1 card. The COPY parameter signifies that the entire History file should be copied. If the COPY parameter is omitted, the user must include UPDAT, COPY, and Insert/Delete cards to direct the SG3 program; he can also include Comments cards to place comments on the SPR. Lines 2 and 3 are examples of the EXEQ SG3 card.



• Figure 25. EXEQ SG3 Card Format and Examples

EXEQ SG5 Cards: Figure 26 shows the three EXEQ SG5 cards that can be used. The card shown in line 1 directs the SG5 program to build a tape SIU to update the user's tape or disk System file. The card shown in line 2 directs the SG5 program to build the tape SIU for updating the user's relocatable library on the System Library file; the system is a minimum disk system with one tape unit. The card shown on line 3 permits the user to modify a relocatable library module on a system library other than the IBM Relocatable Library (IBMLIBR), or to change any control card for the IBM Relocatable Library.



• Figure 26. EXEQ SG5 Cards

Each EXEQ SG5 control card must be preceded by Monitor ASGN cards (see "ASGN Card"), and followed by Pseudo Monitor control cards (see "SG5 Control Cards"). If the EXEQ SG5 , , , EDIT card is used, the EDIT control card (see "SG5 Control Cards") must immediately follow the EXEQ SG5 card and precede the Pseudo Monitor cards.

END Card

The END card, illustrated in Figure 27, must be the last card in the Standard Input Unit and the Alternate Input Unit.

When this card is read from the Standard or Alternate Input Unit, the Resident Monitor does the following:

1. Closes the unit with a rewind and unload, if the unit is tape.
2. Types two messages: END SIU (or END AIU) and ENTER B MESSAGES. All class B console inquiries (see the "Console Inquiries" section) will be accepted except $B1, which will be ignored if the END card was on the Standard Input Unit. Thus, the operator can close the Standard Print Unit, the Standard Punch Unit, and/or the Core Image file. During this time, the System Monitor is in a waiting loop and Teleprocessing system interrupts may occur.
3. Remains in the waiting loop until the $BX inquiry is entered. Then, the Transitional Monitor resumes reading from the Standard Input Unit, which must be on the same physical unit used in the previous batch. If the END card was on the Standard Input Unit, the Transitional Monitor will ignore all cards until it reaches the first JOB card. Then it will begin processing. If the END card was on the Alternate Input Unit, the Transitional Monitor resumes processing with the next Monitor control card on the Standard Input Unit.

Line	Label	Operation	
0.1	MON$$	END	
0.2			

Figure 27. END Card Format

If the END card was on the Alternate Input Unit, a $B1 inquiry (before the $BX inquiry) will make the Transitional Monitor resume reading from the Alternate Input Unit.

Two counters are used to determine the number of JOB cards read since the beginning of a batch. One counter is associated with JOB cards read from the Standard Input Unit; the other with JOB cards read from the Alternate Input Unit. Each time an END card is read from one of the input units, the counter associated with that unit is set to zero.

JOB Card

The JOB card, illustrated in Figure 28, serves to divide the batch into groups of runs. Each time the Monitor reads a JOB card, it performs certain housekeeping functions that prepare the system for the next group of programs. For example, the Monitor cancels certain input/output unit assignments, resets internal switches and indicators, and reproduces the JOB card contents from column 21 to the last significant character before column 72 on the console printer and Standard Print Unit, whether or not other cards are typed and/or printed. At the installation's option, the JOB card can also be punched on the Standard Punch Unit.

MODE Card

The MODE card informs the Monitor that certain conditions are to be established for the job. The GO operand indicates that the output from the following compilations is to be written on the Go file. A MODE card without a GO operand turns the GO indicator OFF. The TEST operand indicates that the Monitor is to modify its end-of-program procedures so that an unusual or special end of program does not cause cancellation of the remainder of the job. The SG operand indicates that System Generation functions are to be performed. The internal indicators set by these operands are reset as shown in Figure 29. Figure 30 shows the MODE card formats; the operands can appear in any order.

Indicator	RESET BY:			
	Initialization of Monitor	JOB Card	MODE Card	Program
GO	YES	YES	YES	Can be
TEST	YES	YES	NO	NO
SG	YES	NO	NO	NO

Figure 29. Indicators Reset by MODE Card Operands

Line	Label	Operation	
0.1	MON$$	MODE	GO
0.2	MON$$	MODE	GO,TEST
0.3	MON$$	MODE	TEST
0.4	MON$$	MODE	SG
0.5	MON$$	MODE	SG,GO
0.6			

Figure 30. MODE Card Formats

Line	Label	Operation	OPERAND
0.1	MON$$	JOB	(name of the job and other information for job identification)
0.2	MON$$	JOB	PLANT 17 PAYROLL
0.3			

• Figure 28. JOB Card Format and Example

PAUSE Card

When the Transitional Monitor recognizes a PAUSE card, illustrated in Figure 31, control passes to the Monitor wait loop. Processing stops. To continue processing, press INQUIRY REQUEST, enter $50, and press INQUIRY RELEASE on the console.

Line	Label	Operation	OPERAND
0,1	MON$$	PAUSE	
0,2			

• Figure 31. PAUSE Card Format

TP Card

The TP card gives instructions to the Tele-processing system. The TP cards to open and close the TP complex are illustrated in lines 1 and 2 of Figure 32. Line 3 shows the format of the TP card for providing information to the Executive program (column 21 of this card must not contain an A).

Linkage Loader Control Cards

Linkage Loader control cards include the following: PHASE, PRTCT, BASE1, CALL, CALLN, CALLP, BASE2, TITLE, DEFIN, SNAP, INPUT, DISCO, CONCO, LINK, COMN, and ENTRY. The last three cards are peculiar to the CHAIN feature. All cards except these three are fixed-field cards.

In the following descriptions, "linksymbol" is any one- to ten-character linkage symbol, left-justified, with trailing blanks in a ten-position field. "abcd/", "acde/", and "wxyz/" stand for five-position linkage symbols. "subprgname" is a linkage symbol that is the subprogram name defined by the TITLE card.

PHASE Card

PHASE cards are used to create a multiphase program and assign a name to the program. Figure 33 shows formats and examples of the PHASE card. The card shown in line 1 is placed at the beginning of the first phase of the program. "progmnamex" is a one- to ten-character name, left-justified, with trailing blanks in a ten-position field. Line 5 shows an example of this card. The card shown in line 2 is placed at the beginning of a succeeding phase. Line 3 shows the format for succeeding PHASE cards with user-specified phase numbers (xxx). "xxx" can be any three-digit number except 999 and 000; in addition, "xxx" cannot be comprised of digits and blanks. An example of this format is shown in line 6.

If the PHASE card is used during System Generation, three additional entries may be made. Line 4 illustrates the format for a System Generation PHASE card. The "n" in column 61 can be 1 or 3. If the Major Phase Directory (Directory 1) is to be inserted at this point, a 1 is entered in column 61; if the Macro Library Directory (Directory 3) is to be inserted, a 3 is entered. The "a" in column 62 specifies the library to be inserted at this point. "a" can be M, R, or C, for Macro, Relocatable, or Create Library, respectively. The "c" in column 63 can be any character or a blank. If "c" is a nonblank character, and the system is tape-oriented, the absolute format records are the "largest possible." If "c" is blank, or the system is disk-oriented, the size is 2,165 characters per record. An example of the PHASE card as used during System Generation is shown on line 7.

PRTCT Card

The PRTCT card is used to control the clearing of linkage symbols from the symbol table. The card can be

Line	Label	Operation	OPERAND
0,1	MON$$	TP	AOPEN
0,2	MON$$	TP	ACLOSE
0,3	MON$$	TP	(information for the Executive program)
0,4			

• Figure 32. TP Card Formats

Line	Label	Operation	OPERAND
0,1		PHASE	progmnamex
0,2		PHASE	
0,3	XXX	PHASE	
0,4	XXX	PHASE	progmnamex, mac
0,5		PHASE	PROG1
0,6	005	PHASE	
0,7		PHASE	PROGRM3, 1RT
0,8			

• Figure 33. PHASE Card Formats and Examples

placed immediately before a BASE1 or PHASE card, or anywhere within a subprogram except between the TITLE and BASE1 cards. Figure 34 shows formats and examples of the PRTCT card. Examples of the formats in lines 1 through 3 are shown in lines 5 through 7, respectively. The "xxxxx" in line 3 is any actual machine address. The card shown in line 4 removes the protection.

Line	Label	Operation	
0 1		PRTCT	linksymbol
0 2		PRTCT	abcd/
0 3		PRTCT	xxxxx
0 4		PRTCT	
0 5		PRTCT	SUBPROG3
0 6		PRTCT	Z065/
0 7		PRTCT	15000
0 8			

• Figure 34. PRTCT Card Formats and Examples

BASE1 Card

The BASE1 card is used to control the relocation factor. The card can be placed immediately after the TITLE card, or immediately after a PHASE card or PHASE and PRTCT cards. Figure 35 shows formats and examples of the BASE1 card. Examples of the formats in lines 1 through 3 are shown in lines 6 through 8, respectively. The "xxxxx" in line 3 is any actual machine address. Line 4 shows a card used to set the current relocation factor to the next higher multiple of 100. Line 5 shows a card used to set the relocation factor to Base Zero.

Line	Label	Operation	
0 1		BASE1	linksymbol
0 2		BASE1	abcd/
0 3		BASE1	xxxxx
0 4		BASE1	*+X00
0 5		BASE1	
0 6		BASE1	SUBPROG3
0 7		BASE1	Z065/
0 8		BASE1	15000
0 9			

• Figure 35. BASE1 Card Formats and Examples

CALL, CALLN, and CALLP Cards

The CALL, CALLN (Call Now), and CALLP (Call and Patch) cards are used to request a subprogram from the System Library file or Go file. A CALLN card differs from a CALL card only in that it directs the Linkage Loader to locate and process the specified subprogram immediately. In addition to requesting a subprogram, the CALLP card also directs the Linkage Loader to incorporate patches into the specified subprogram. The patches must be placed immediately after the CALLP card on the Standard Input Unit. The CALL card can be placed within the control cards for a phase or within a subprogram. The CALLN and CALLP cards can only be placed within the control cards for a phase. Figure 36 shows formats and examples of these cards. Examples of the formats in lines 1 through 3 are shown in lines 4 through 6, respectively.

NOTE: When used to call user-written modification routines in the Sort Definition process, the CALL or CALLN card must have the exit point (e.g., P33) specified in columns 1-3.

Line	Label	Operation	
0 1		CALL	subprgname
0 2		CALLN	subprgname
0 3		CALLP	subprgname
0 4		CALL	SUBPROG4
0 5		CALLN	SUBPROG4
0 6		CALLP	SUBPROG4
0 7			

• Figure 36. CALL, CALLN, and CALLP Card Formats and Examples

BASE2 Card

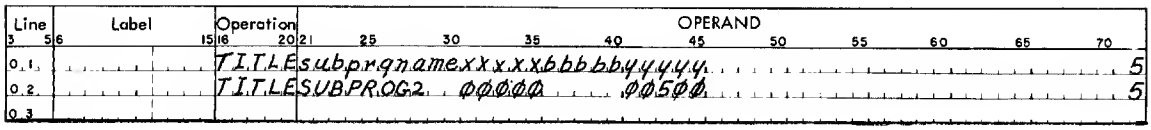
The BASE2 card sets the upper limit of a common data area. The card must be read before the processing of any subprograms affected by it. It can be placed within a subprogram, but before any references to a common data area. Figure 37 illustrates formats and examples of the card. Examples of the formats in lines 1 through 3 are shown in lines 5 through 7, respectively. The "xxxxx" in line 3 is an actual machine address. The card shown in line 4 sets the upper limit of the common data area as the top of core storage.

Line	Label	Operation	
0 1		BASE2	linksymbol
0 2		BASE2	abcd/
0 3		BASE2	xxxxx
0 4		BASE2	
0 5		BASE2	UPAREA1
0 6		BASE2	Z073/
0 7		BASE2	36000
0 8			

• Figure 37. BASE2 Card Formats and Examples

TITLE Card

The TITLE card is the first card of each subprogram. The Linkage Loader TITLE card is produced by the language processors and is the first card in the relocatable object deck generated by the specific processor. The format is not the same as that for the Autocoder symbolic TITLE card. Figure 38 shows the format of the Linkage Loader TITLE card, and an ex-



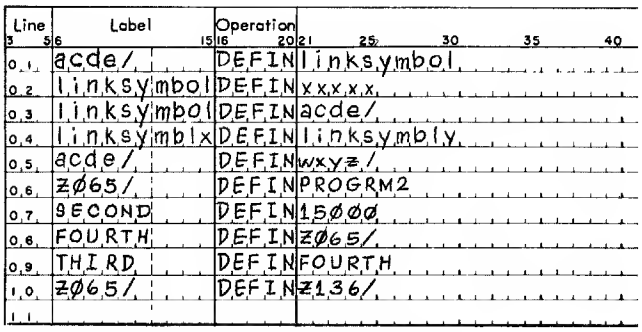
• Figure 38. TITLE Card Format and Example

ample of the eard as generated by the Autoeoder processor. "xxxxx" is the base to whieh the subprogram was eompiled (ordinarily 00000 or blank for Autocoder, the number of positoins of the IBCOBOL subprogram for COBOL, and 00001 for FORTRAN programs). "yyyyy" is the number of core storage loeations in the common data area required by this subprogram. This field is left blank by COBOL and FORTRAN proeessors. All proeessors place a 5 in eolumn 72.

NOTE: When used to head a user-written modification routine in the Sort Definition proeess, the TITLE eard must have the exit point (e.g., GA2) speeifiel in columns 1-3.

DEFIN Card

The DEFIN card is loeated within a subprogram. The card defines the linkage symbol specified in columns 6 through 15 for ineorporation into the symbol table. The symbol can then be used by another subprogram as an entry point to instruetions or a data field in the first subprogram. This statement can be ineluded in the source deek for an Autocoder eompilation to establish a linkage symbol. Figure 39 shows the formats and examples of this eard. "aede/" in lines 1 and 5, and "wxyz/" in lines 5 are five-eharaeter linkage symbols. "xxxxx" in line 2 is an aetual maehine address. Examples of the formats in lines 1 through 5 are shown in lines 6 through 10, respectively.



• Figure 39. DEFIN Card Formats and Examples

SNAP Card

Although a Utility program in function, the Snapshot program is exeeuted by either a Linkage Loader SNAP card or an Autoeoder calling sequenee. If the Snapshot program is included at System Generation, it is also executed eaeh time entry is made to the Resident Monitor Unusual End-of-Program routine. Like the Utility programs, Snapshot plaees its output on the SPR.

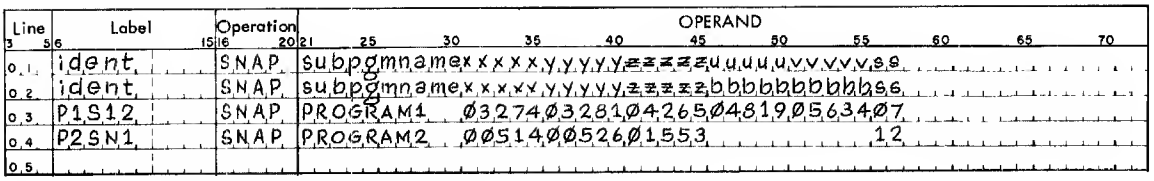
In the SNAP eard formats shown in lines 1 and 2 of Figure 40, "ident" is any one-to-five eharaeter identifieation for the Snapshot printout. "subpgmname" is any one-to-ten eharaeter linkage symbol, left-justified, with trailing blanks in a ten-position field. "xxxxx" is the reloeatable address of the instruction immediately preeeding the area for whieh the Snapshot will be taken. If two areas are speeified (the user ean designate two areas per eard), the address should be that of the instruetion preeeding the first area. "yyyyy" is the reloeatable address of the lower limit of an area for which the Snapshot is to be taken. "zzzzz" is the reloeatable address of the upper limit of the area. Similarly, "uuuuu" and "vvvvv" are the lower and upper limits for the second area. If only one area is speeified, eolumns 46 through 55 must be blank. The "ss" in eolumns 56-57, lines 1 and 2, is any two-digit number indicating the length of the instruetion at "xxxxx". If this number is less than ten, it must eontain the leading zero.

The SNAP card must be positioned in the Standard Input Unit after the subprogram it affeets, or after the eall for that subprogram. It must be among the cards processed for that phase, and must be read before the Linkage Loader symbol table is erased. The SNAP eard eannot be used in a eompile-and-go operation; in this ease, a Snapshot ealling sequence must be used within the program (see *IBM 1410/7010 Operating System; Utility Programs,* Form C28-0353).

Printing begins only at a hundreds position and ends only with a 99's position. Examples of the SNAP eard are shown in lines 3 and 4.

INPUT Card

The INPUT eard ean be used to direet the Linkage Loader to read its control cards from a souree other than the Standard (or Alternate) Input Unit. The eard ean be plaeed anywhere within the eontrol eards for the Linkage Loader. Line 1 of Figure 41 shows the format of the eard; lines 2 and 3 are examples. "xxx" must be a symbolic unit to whieh a physieal unit is eurrently assigned. The example shown in line 3



• Figure 40. SNAP Card Formats and Examples

causes the Linkage Loader to revert to reading from the SIU. When the system is in SG mode, the only valid operands for this card are MW2 or SIU.

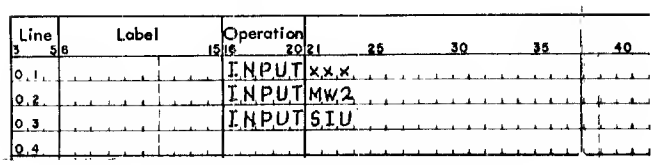
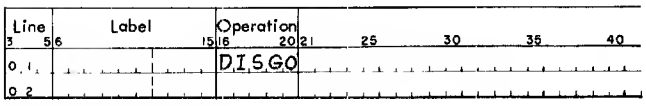


Figure 41. INPUT Card Format and Examples

DISGO Card

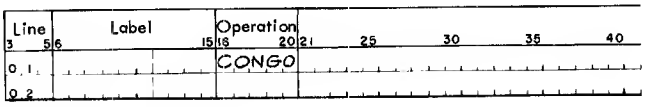
The DISGO card specifies that the Go file is not to be searched for subprograms. To be effective, the card must be placed before CALLN, CALLP, PHASE, SNAP, and Monitor control cards, and must be read before end of file is reached on the Standard or Alternate Input Unit. The card is shown in Figure 42.



• Figure 42. DISGO Card

CONGO Card

The CONGO card cancels the DISGO card function. It can be placed anywhere after the DISGO card. Figure 43 shows the CONGO card.



• Figure 43. CONGO Card

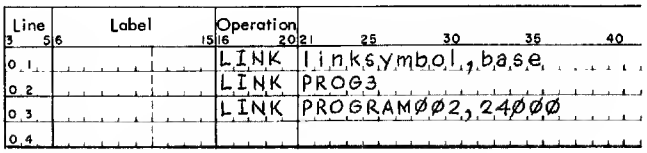
LINK, COMN and ENTRY Cards — Control Cards for the CHAIN Feature

The fifth and sixth parameters of the MON$$ EXEQ LINKLOAD card are used to specify that the CHAIN feature be used in loading the subprograms. The CHAIN feature is a process by which multiphase programs can be created from subprograms that have been written in one or more of the available Operating System languages. Three control cards in addition to the EXEQ LINKLOAD card provide chaining information to the Linkage Loader. These cards are: LINK, COMN, and ENTRY. In addition, an END card must immediately follow the group of cards defining the chained program.

LINK Card

The LINK card is used to define a main or dependent link; it specifies the main subprogram of the link and, if desired, the point to which the link is relocated. Any relocatable subprograms following the LINK card are incorporated into the link.

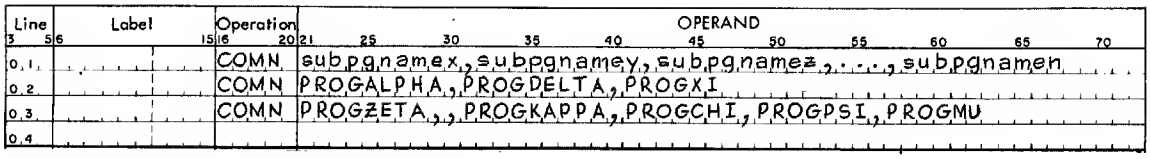
Line 1 of Figure 44 shows the format of the LINK card. "linksymbol" is the linkage symbol for the name of the main subprogram of the link. "base" is the linkage symbol or absolute address of the origin point of the link. If the "base" entry is omitted for a dependent link, the Linkage Loader assigns the origin to the end of the main link. Lines 2 and 3 are examples of the LINK card. The LINK card, for a main link, may also specify the name of the multiphase program in columns 6 through 15.



• Figure 44. LINK Card Format and Examples

COMN Card

The COMN card specifies additional subprograms to be included with the link. The card calls the subprograms from the Go file or the System Library file. Programs specified are loaded before the subprogram named in the LINK card. The COMN card can be used to load additional subprograms for Autocoder and FORTRAN links; however, the card can be used only in the loading of additional programs for the main link of a program written in COBOL.



• Figure 45. COMN Gard Format and Examples

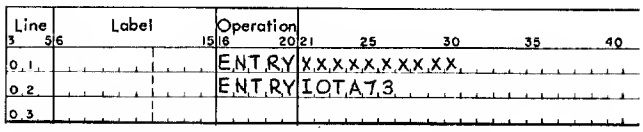
Relocatable decks in the SIU between the LINK card and the COMN card are loaded before the subprograms named in the COMN card; relocatable decks between the COMN card and the next LINK or END card are loaded after the subprograms in the COMN card.

Line 1 of Figure 45 shows the format of the COMN card. If two consecutive commas do not appear on the card, the Linkage Loader loads the subprograms in the order in which it locates them. If two consecutive commas do appear, all subprograms before the double commas are loaded in the order found, but before any subprograms listed after the double commas. Lines 2 and 3 are examples of the COMN card. In the card shown in line 3, PROGZETA is loaded before any other programs listed on the card.

ENTRY Card

The ENTRY card is used to specify the entry point of a link that does not contain a primary subprogram. This card should be placed after the LINK card specifying the subprogram into which entry will be made. The ENTRY card cannot be used for links written in COBOL.

Figure 46 shows the format of the card and an example. "xxxxxxxxxx" is the entry point; it can be a linkage symbol or five-character absolute address.



• Figure 46. ENTRY Card Format and Example

If the ENTRY card is used outside the CHAIN feature, a 4 must be punched in column 72.

The END card that must follow the group of cards defining the chained program is shown in Figure 47.

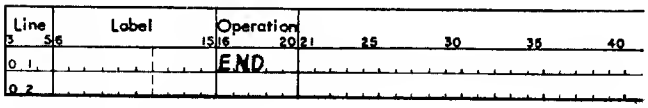


Figure 47. END Gard

System Generation Program Control Cards

There are two main types of System Generation program control cards: those that can be used for several of the System Generation programs, and those used only for specific SG programs. Cards of the first type are known as SG control cards; cards for specific programs are referred to using the name of the program (e.g., SG3 control cards).

SG Control Card

SG control cards direct the SG1 and SG2 programs in performing library maintenance functions. Specific SG cards are also used in the execution of the SG4 and SG5 programs. The cards are placed in the control card deck after the MONSS EXEQ card for the SG program being executed. No SG control card can contain any punches in columns 1 through 5.

The SG control cards are divided into four classes. Class I consists of the INCLD card. Classes II, III, and IV consist of the Macro Library SG cards, Create Library SG cards, and Relocatable Library SG cards, respectively. Only certain classes and combinations of classes can be used with the SG1 and SG2 programs. Table III summarizes these combinations.

Table III. Acceptable Groupings of SG Control Cards for SG1 and SG2 Programs

	TAPE	DISK
SG1	*Group 1* Classes II, III, IV	*Group 1* Class III*
	Group 2 Classes I, III*	*Group 2* None
SG2	*Group 1* None	*Group 1* Class I
	Group 2 None	*Group 2* Classes II, III, IV**

* Of the Glass III cards, only the CREAT card may be included in this group. Linkage Loader control cards may be intermixed.

** Class IV cards must be last in this group.

NOTE: Each group must have an END card (END in columns 16 through 18) as its last card.

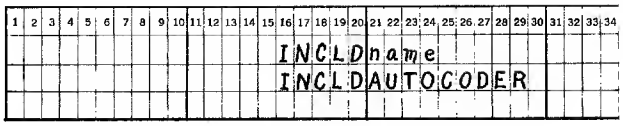
```
      6         16   21
      MON$$      OATE YROAT
      MON$$      JOB  ILLUSTRATE LIBRARY CREATION, GENERATE RUN
      MON$$      ASGN MJB,A1
      MON$$      ASGN MR0,A3
      MON$$      ASGN MW2,AS
      MON$$      ASGN MG0,B2
      MON$$      ASGN MW1,B4
      MON$$      ASGN MW3,BS
      MON$$      MOOE G0,SG
      MON$$      EXEQ AUTOCODER,,,NOFLG,NOPCH
                 HEAORGENERATE SGF
                 GEN01P1,R1,X1
                 GEN02/MOM/,1,A0,A1,A2,A3,A4,A5,A6,A7,A8,A9,
                 GEN02/MOM/,2,B0,B1,B2,B3,B4,B5,B6,B7,B8,B9,
                 GEN081700090119,,SS,S,099,A0,R1,,,P1,X1,,,B6,SNAP
                 GEN0910
                 GEN1010,A4,B4,AS,BS,A6
                 GEN11
                 DEVDF1,729,1402,1403
                 OEVDF2,729
                 IOKOF1410,,,,,,,,,70000
                 ENO
      MON$$      EXEQ SG1                                    7
                 LOCATC,CREATLIB
                 INSERC
                 LOCATR,IBMLIBR
                 INSERR
***              AOO  R,NEWNAME
*** RELOCATABLE MODULES ***
                 LOCATM,AUTOCOOER
                 INSERM
                 ENO
                 CREATTMONITOR
                 CREATRESTART
                 CREATSYSGEN3
                 CREATTAUTOCOOE
                 CREATTLINKLOAO
                 PHASEIBMLIBR                                 R
***              PHASENEWNAME                                 R
                 CREATTSYSGEN1
                 PHASECREATLIB                                C
                 CREATTSYSGEN2
                 CREATUTILITIES
                 CREATTMACROPRT
                 CREATTFORTRAN
                 CREATTCOBOL
                 ENO
      MON$$      EXEQ LINKLOAD
                 INPUTMW2
      MON$$      EXEQ SG2                                  L7
      MON$$      ENO
```

Figure 48. Example of Cards for an SG Run

Rules for positioning of the individual cards are explained in the description of each card. The general relative positions of the various types of cards for a System Generation run is shown in Figure 48. This figure shows an example of the control cards that can be used in a tape-oriented system for the addition of a user's relocatable library to the System Generator file. All cards from the GEN01P1,R1,X1 card through the IOKDF 1410,,,,,,,,,70000 card are macro-statements; these cards are described in detail in the publication *IBM 1410/7010 Operating System; System Generation*, Form C28-0352.

Class I SG Cards — The INCLD Card

The INCLD card directs the System Generation program to copy an entire program or library from one System Generator file to another. Figure 49 shows the format of this card, and an example. If "name" identifies an absolute-format program on the first, or source SGF, the program is copied onto the second, or output SGF. In a tape-oriented system, the program is copied onto the Job file as an intermediate step.



● Figure 49. INCLD Card Format and Example

If "name" identifies a Create or Relocatable Library on the source SGF, the library is inserted at this point on the output SGF. If the system is tape-oriented, header labels only are written on the Job file and symbolic unit MW1 as the intermediate step. The library must previously have been referenced by a LOCAT card for that particular library, and must have been updated or copied. (Descriptions of the various LOCAT cards are contained in the Class II, III, and IV SG Cards sections.)

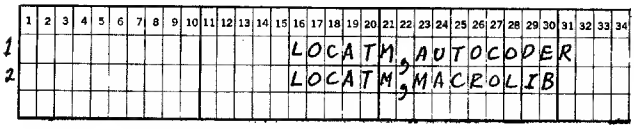
Class II SG Control Cards — Macro Library Cards

Class II control cards direct the SG program to perform library maintenance functions on the Macro Library. There are four types of cards: LOCAT, INSER,

REPLC, and DELET. Each Macro Library control card must contain an M in column 21.

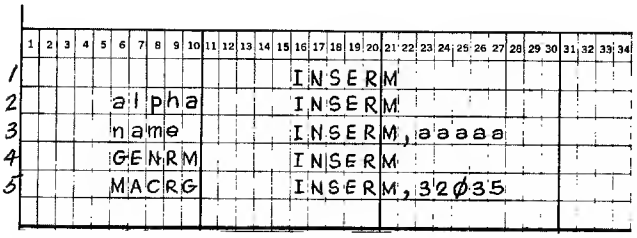
If new macro statements are being inserted or are replacing other statements, the cards on which the statements are recorded must contain sequence numbers in columns 1 through 5. The cards must be in ascending order. If macro statements are being inserted, are replacing other statements, or are being deleted, the SG program performs no resequencing of the statements in the macro being acted upon.

LOCAT Card (Class II): Before maintenance functions can be performed on the Macro Library, the LOCAT card must be used to locate the library. This card must appear before any group of INSER, REPLC, or DELET Class II control cards. Figure 50 shows the two forms this card can take. The card shown on line 1 is used to locate the Macro Library on a System Generator file for a tape-oriented system; line 2 shows the card used to locate the Macro Library on an SGF for a disk-oriented system.



• Figure 50. Class II LOCAT Cards

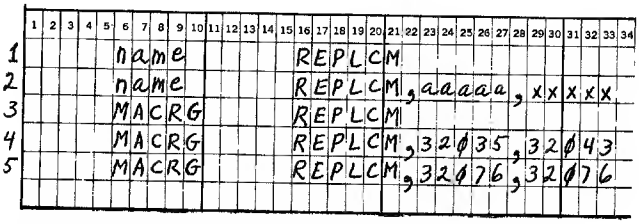
INSER Card (Class II): The INSER card directs the SG program to either copy the entire Macro Library, copy the library and insert a new element at the end, or copy the library and insert new statements. A Class II LOCAT card must always precede a single Class II INSER card or any group of Class II INSER, REPLC, or DELET cards. If the system is tape-oriented, the library is copied onto symbolic unit MW1; if the system is disk-oriented, the library is copied onto the output SGF. Figure 51 shows formats and examples of this card.



• Figure 51. Class II INSER Card Formats and Examples

Line 1 shows Format 1 of the card. This card directs the SG program to copy the entire library. Format 2 of the INSER card is shown on line 2. This card directs the SG program to copy the entire library and insert the library element "alpha" at the end of the library. An example of this format is shown on line 4. The new element must follow the INSER card in the SIU. Format 3 of the INSER card, shown on line 3, directs the SG program to insert new statements in the "name" macro. The statements are inserted after statement number "aaaaa" in the "name" macro. The new statements must follow the INSER card on the SIU. Line 5 contains an example of this INSER card.

REPLC Card (Class II): Figure 52 shows formats and examples of the REPLC card. Format 1, shown in line 1, directs the SG program to replace the "name" macro with a new element of the same name. The element must follow the REPLC card in the SIU. An example of the Format 1 REPLC card is shown on line 3.



• Figure 52. Class II REPLC Card Formats and Examples

Format 2, shown on line 2, directs the SG program to delete from the "name" macro the statements with sequence numbers "aaaaa" through "xxxxx", and to replace these with new statements. The new statements must follow the REPLC cards on the SIU. An example of this format is shown in line 4. If a single statement is being replaced, "aaaaa" should be equal to "xxxxx" (see example in line 5). A Class II LOCAT card must always precede a single Class II REPLC card, or any group of Class II INSER, REPLC, or DELET cards.

DELET Card (Class II): Figure 53 shows formats and examples of the DELET card. Format 1, shown in line 1, directs the SG program to delete the "name" macro from the Macro Library. An example of the Format 1 DELET card is shown in line 3.

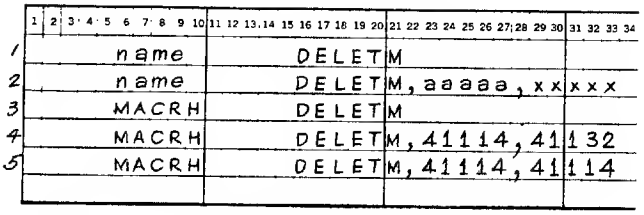


Figure 53. Class II DELET Card Formats and Examples

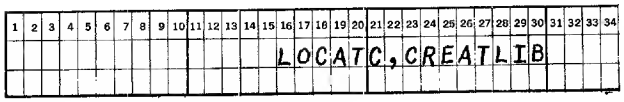
Line 2 illustrates Format 2 of the DELET card. This format directs the SG program to delete statements

"aaaaa" through "xxxxx" from the "name" macro. An example of this format is shown in line 4. If a single statement is being deleted, "aaaaa" should be equal to "xxxxx" (see example in line 5). A Class II LOCAT card must always precede a single Class II DELET card or any group of Class II INSER, REPLC, or DELET cards.

Class III SG Control Cards — Create Library Cards

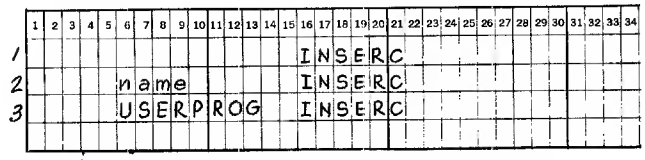
Class III control cards direct the SG program to perform maintenance operations on the Create Library, and prepare selected elements for use. There are six types of cards: LOCAT, INSER, GENER, REPLC, DELET, and CREAT.

LOCAT Card (Class III): Before maintenance functions can be performed on the Create Library, the LOCAT card must be used to locate the library. This card must appear before any group of INSER, GENER, REPLC, or DELET Class III control cards. Figure 54 shows the Class III LOCAT card.



• Figure 54. Class III LOCAT Card

INSER Card (Class III): The INSER card directs the SG program to either copy the entire Create Library or copy the library and insert a new packet at the end. (Each packet in the library is made up of Linkage Loader control cards.) A Class III LOCAT card must precede a single Class III INSER card or any group of Class III INSER, GENER, REPLC, or DELET cards. If the system is tape-oriented, the library is copied onto symbolic unit MW1; if the system is disk-oriented, the library is copied onto the output SGF. Figure 55 shows formats and an example of this card.



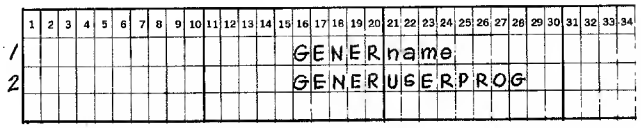
• Figure 55. Class III INSER Card Format and Example

Line 1 shows Format 1 of the card. This card directs the SG program to copy the entire library. Format 2 of the INSER card is shown on line 2. This card directs the SG program to copy the entire library and insert the library element "name" at the end of the library. An example of Format 2 is shown in line 3. If Format 2 is used, the card must be followed on the SIU by a GENER card and new packet.

GENER Card (Class III): The GENER card directs the SG program to create a header label for a packet being added to the Create Library, or replacing another packet. If the Format 2 INSER card or REPLC card is used, a GENER card must immediately follow on the SIU. The GENER card must, in turn, be followed by the new Create packet.

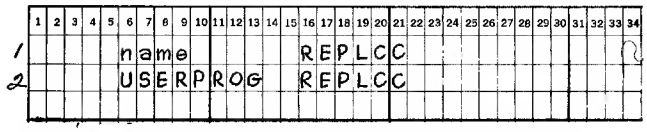
Line 1 of Figure 56 shows the format of the GENER card. "name" is the identifying name of the packet, and can be a maximum of ten characters. An example of this card is shown in line 2.

To utilize this packet as input to the Linkage Loader during a System Generation run, the user must include a CREAT card with the "name" specified in the GENER as the CREAT card operand.



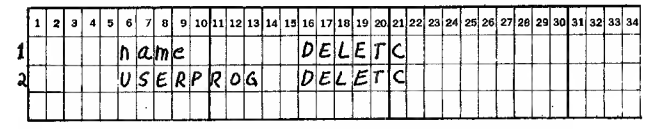
• Figure 56. Class III GENER Card Format and Example

REPLC Card (Class III): The REPLC card directs the SG program to replace the "name" Create packet with a new packet having the same name. A Class III LOCAT card must precede any group of Class III INSER, GENER, REPLC, or DELET cards. A GENER card must immediately follow the Class III REPLC card on the SIU. Line 1 of Figure 57 shows the format of the Class III REPLC card; line 2 is an example of the card.



• Figure 57. Class III REPLC Card Format and Example

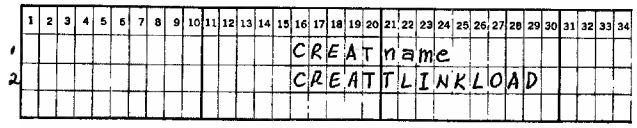
DELET Card (Class III): The DELET card directs the SG program to delete the "name" packet from the Create Library. A Class III LOCAT card must precede a single Class III DELET card or any group of Class III INSER, GENER, REPLC or DELET cards. Line 1 of Figure 58 shows the format of the card; line 2 is an example.



• Figure 58. Class III DELET Card Format and Example

CREAT Card: The CREAT card directs the SG program to search the Create Library (CREATLIB) for the "name" Create packet; the program deblocks the records of this packet into card-image records, and transfers the card-image records to Work file MW2. The records subsequently serve as input to the Linkage Loader.

Line 1 of Figure 59 shows the format of the card. "name" is the identifier of the packet. Line 2 is an example.



• Figure 59. Class III CREAT Card Format and Example

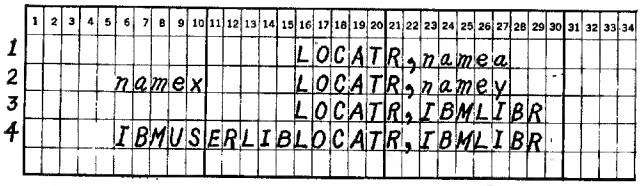
Linkage Loader control cards, or relocatable object decks, may be intermixed with the CREAT cards; the order of the output on MW2 will coincide with the order of the input on the SIU. An INPUT MW2 card must follow the MON$$ EXEQ LINKLOAD card used to execute the Linkage Loader.

Class IV Control Cards — Relocatable Library Cards

Class IV control cards direct the SG program to perform library maintenance functions on a relocatable library. There are six types of cards: LOCAT, ALTLB, ADD, INSER, REPLC, and DELET.

LOCAT Card (Class IV): Before maintenance functions can be performed on a relocatable library residing on an SGF or SOF, the Class IV LOCAT card must be used to locate the library. This card can also be used to change the name of a relocatable library. The Class IV LOCAT card must precede any group of Class IV ADD, INSER, REPLC, and DELET cards performing maintenance on an SGF or SOF library.

Line 1 of Figure 60 shows Format 1 of the Class IV LOCAT card. "namea" is the name of the library. An example of the Format 1 LOCAT card is shown on line 3.



• Figure 60. Class IV LOCAT Card Formats and Examples

Line 2 shows Format 2 of the Class IV LOCAT card. This format is used to change the name of a relocatable library. "namex" is the original name; "namey" is the new name. An example of this card is shown on line 4.

ALTLB Card: The ALTLB card performs functions similar to those of the Class IV Format 1 LOCAT card. However, the ALTLB card performs these functions for the relocatable library assigned as the System Library file. If any relocatable library except those residing on the SGF or SOF is to be maintained, that library must be assigned to symbolic unit LIB. Maintenance of this library is the only function that can be performed during this System Generation run.

Line 1 of Figure 61 shows the format of the ALTLB card. "xxxx" is the type of physical unit assigned to LIB. This operand can be TAPE, 1301, or 1302. Line 2 is an example of the ALTLB card.

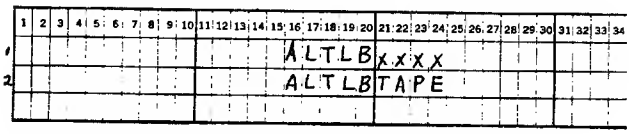


Figure 61. Class IV ALTLB Card Format and Example

ADD Card: The ADD card directs the SG program to create header information for a new library. The records that constitute the new library must immediately follow the ADD card on the SIU. A Class IV LOCAT card must precede a single ADD card or any group of Class IV ADD, INSER, REPLC, or DELET cards. Line 1 of Figure 62 shows the format for this card. "name" is the identifying name of the new library, and can be a maximum of ten characters. An example of the ADD card is shown on line 2.

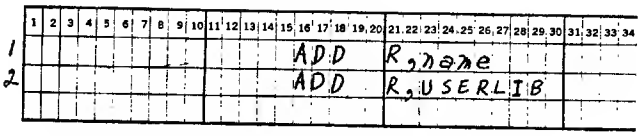
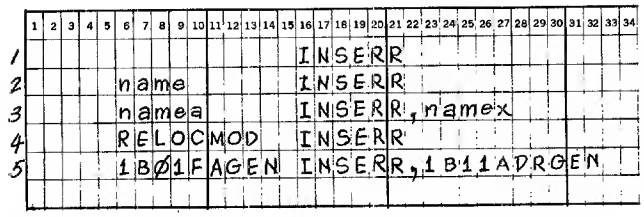


Figure 62. Class IV ADD Card Format and Example

INSER Card (Class IV): The INSER card directs the SG program to copy an entire relocatable library, copy the library and insert a new module at the end, or copy the library and insert a new module in front of another. The Class IV LOCAT (or ALTLB) card for the relocatable library must always immediately precede a single INSER card or any group of Class IV ADD, INSER, REPLC, or DELET cards. If the system is tape-oriented, the library is copied onto symbolic unit MW1; if the system is disk-oriented, the library is copied onto the output SGF.

Line 1 of Figure 63 shows Format 1 of the Class IV INSER card. This card directs the SG program to copy

an entire relocatable library. Format 2 of the INSER card is shown on line 2. This format of the INSER card directs the SG program to copy the relocatable library and insert the module identified by "name" at the end. The module can either follow the INSER card in the SIU or be on the Go file. An example of this card is shown on line 4. Format 3, shown on line 3, directs the SG program to copy the relocatable library and insert the "namea" module in front of the "namex" module. The "namea" module can either follow the INSER card in the SIU or be on the Go file. If more than one module is to be inserted, they can follow the "namea" module on the SIU or Go file; no additional INSER cards are necessary. An example of the Format 3 INSER card is shown on line 5.

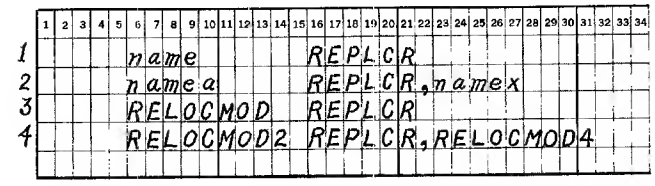


• Figure 63. Class IV INSER Card Formats and Examples

REPLC Card (Class IV): Figure 64 shows formats and examples of the REPLC card. Format 1, shown in line 1, directs the SG program to replace the relocatable library module "name" with a new module having the same identifier. The new module can either follow the REPLC card in the SIU or be on the Go file. An example of this format is shown in line 3.

Format 2, shown in line 2, directs the SG program to delete the "namea" through "namex" modules and replace them with a single module whose identifier is "namea". The new "namea" module can either follow the REPLC card in the SIU or be on the Go file. An example of this format is shown in line 4.

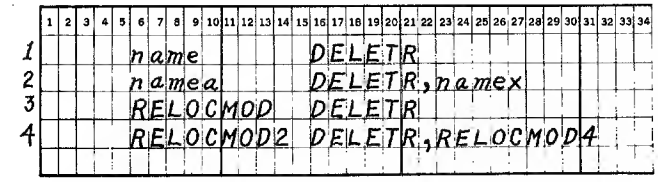
A Class IV LOCAT card must precede a Class IV REPLC card or any group of Class IV ADD, INSER, REPLC, or DELET cards.



• Figure 64. Class IV REPLC Card Formats and Examples

DELET Card (Class IV): Figure 65 shows formats and examples of the DELET card. Format 1, shown in line 1, directs the SG program to delete the "name" module from the relocatable library. An example of this card is on line 3. Format 2, shown in line 2, directs the SG program to delete modules "namea" through "namex". An example of this card is shown in line 4.

A Class IV LOCAT (or ALTLB) card must precede a single Class IV DELET card or any group of Class IV ADD, INSER, REPLC, or DELET cards.



• Figure 65. Class IV DELET Card Format and Examples

Label Information Control Card for SG2 Program

If system file tape labels are introduced, a label information card must immediately follow the MON$$ EXEQ SG2 card on the SIU. This card specifies the information to be used in writing the labels.

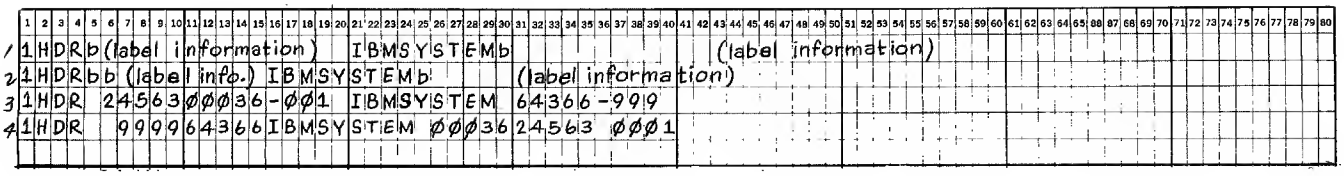
Figure 66 shows formats and examples of the card. Line 1 shows the general format for IBM 80-character labels. Specific fields are detailed in the *Basic Input/Output Control System* publication. The file identification field (columns 21 through 30) must contain IBMSYSTEMb. An example of this card is shown in line 3. Line 2 shows the general format for IBM Standard 120-character labels. If these labels are specified in the EXEQ SG2 card, the program adds a 40-position blank field to the 80 characters taken from this field. IBMSYSTEMb must appear in columns 16 through 25. Line 4 shows an example of the label information card for 120-character labels.

SG3 Program Control Cards

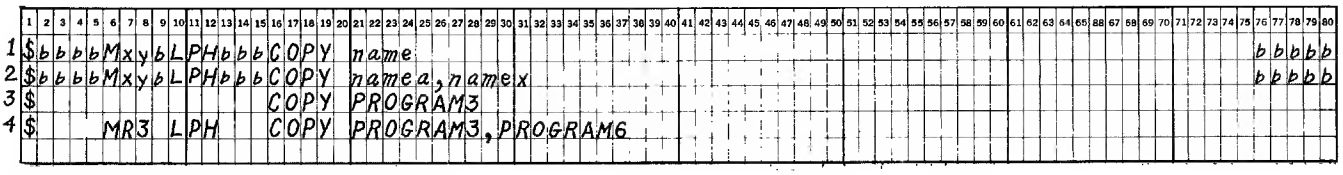
SG3 control cards direct the SG3 program to perform various operations on the History file. Four types of control cards can be used: COPY, UPDAT, Insert/Delete, and Comments cards. In all these cards, a dollar sign ($) must appear in column 1; this indicates that the card is an SG3 control card. The cards must follow the MON$$ EXEQ SG3 card on the SIU.

COPY Card

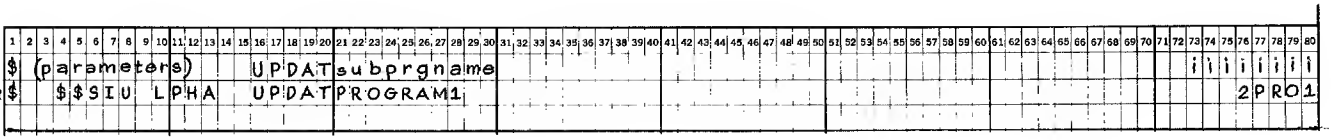
The COPY card directs the SG3 program to copy one or more subprograms from a previous History file onto a new History file. Lines 1 and 2 of Figure 67 show the general formats of this card. In both formats,



• Figure 66. SG2 Label Information Card — Formats and Examples



• Figure 67. COPY Card Format and Example



• Figure 68. UPDAT Card Format and Example

entries in columns 6 through 12 provide file location and print- and punch-option information. Mxy in columns 6-8 specifies the location of the old History file. This may be any Work or Reserve file specified for the system at System Generation. "x" can be W or R, for Work or Reserve file, respectively. "y" can be any number from 0 through 9 or any letter from A through Z. If this entry is omitted (columns 6 through 8 left blank), the SG3 program assumes that the old History file is on symbolic unit MW4. An L in column 10 signifies that the subprogram(s) being copied from the old History file specified in columns 21-75 should also be written on the Standard Print Unit. If this column is blank, the specified subprogram(s) is not written on the SPR. A "P" in column 11 signifies that the subprogram(s) being copied from the old History file should also be written on the Standard Punch Unit. If this column is blank, the subprogram(s) is not written on the SPU. An H in column 12 signifies that the subprogram(s) should be copied onto a new History file on symbolic unit MW5. If this column is blank, and there is any entry other than a blank in columns 6 through 15, no new History file is written. If column 12 is blank, and all other columns in the column 6 through 15 field are blank, the SG3 program assumes that the specified subprogram(s) is to be copied from the old History file on MW4 onto the new History file on MW5.

Columns 21 through 75 are used to specify the name(s) of the subprogram(s) being copied with the options specified in columns 6 through 12. If one subprogram is being copied, the format shown on line 1 of Figure 67 is used. If two or more consecutively located subprograms are being copied, the format shown in line 2 is used. Line 3 contains an example of the format shown in line 1; line 4 contains an example of the format shown in line 2.

UPDAT Card

The UPDAT card directs the SG3 program to add new subprograms to the History file, or to change subprograms already on the History file. In both cases, a new History file is produced. The UPDAT card must be followed by an Insert/Delete card.

Line 1 of Figure 68 shows the general format of the UPDAT card. Entries in columns 4 through 15 provide file location, modification level, print and punch option, sequence number option, and Autocoder option information. These entries are detailed in the *System Generation* publication. The SG3 program assigns sequence numbers for all statements on the new History file, unless the user voids this option by entering an N in column 9 of the UPDAT card. "subprgname", which can be a maximum of 10 characters, is the name of the subprogram to be updated; the options specified in columns 4 through 13 apply to the updating

of this subprogram. The "iiiiiiii" in columns 73-80 constitutes the identification field contents for a COBOL or FORTRAN History file; this information is placed in columns 73-80 of each History file card in the subprogram, and/or in each compiler input file card. If an Autocoder History file is being maintained, the Identification field is in columns 76 through 80. An example of the UPDAT card is shown in line 2 of Figure 68.

Insert/Delete Card

The Insert/Delete card directs the SG3 program to insert symbolic-language cards into, or delete symbolic-language cards from, the subprogram specified in the UPDAT card. The UPDAT card must immediately precede the first Insert/Delete card. If symbolic-language cards are being inserted, they must immediately follow the Insert/Delete card. Additional card groups, each consisting of the Insert/Delete card and the symbolic-language cards being inserted (if any), follow on the SIU. If the groups are consecutive, no additional UPDAT cards are required. FORTRAN cards being inserted require the generation, by the SG3 program, of pseudo sequence numbers (see *System Generation*).

Line 1 of Figure 69 shows the format of the Insert/Delete card. "xxxxx" is a subprogram card sequence number. If "xxxxx" is the only entry, an insertion of cards is indicated. The symbolic-language cards after the Insert/Delete card are inserted following the subprogram card identified by "xxxxx". If "xxxxx, yyyyy" is specified, a deletion is indicated. Symbolic-language cards to be inserted may or may not be present on the SIU. Cards with sequence numbers "xxxxx" through "yyyyy" are deleted. Any symbolic-language cards following the Insert/Delete card are inserted in their place. All sequence numbers may be specified with leading zeros omitted. Examples of the Insert/Delete card are shown in lines 2 and 3 of Figure 69.

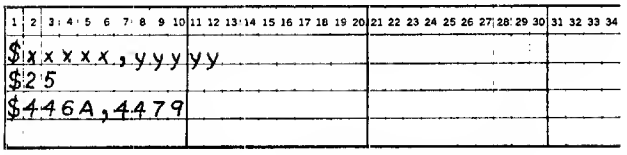


Figure 69. Insert/Delete Card Format and Examples

Comments Card

The Comments card directs the SG3 program to place the indicated descriptive information onto the SPR. Line 1 of Figure 70 shows the format of this card; line 2 is an example.

SG4 Program Control Cards

The following SG control cards can be used in the execution of the SG4 program:

CARD	LOCATION IN CONTROL CARD DECK
Class II REPLC or INSER	After EXEQ SG4 card, and immediately preceding each Macro patch.
Class III REPLC, INSER or GENER	After EXEQ SG4 card, and immediately preceding each Create packet.
Class IV REPLC or INSER	After EXEQ SG4 card, and immediately preceding each Relocatable Library module (if the module is not on the Go file).
Class II, III, or IV DELET	After EXEQ SG4 card, but not immediately preceding any library cards.

The elements must appear in the following order: Macro patches, Create packets, Relocatable Library modules. The SG4 program can use only the control cards listed above; there are no control cards unique to the program.

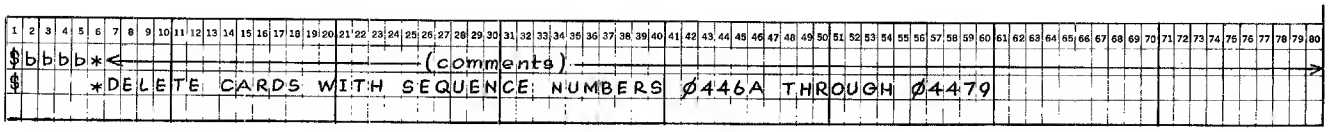
SG5 Program Control Cards

There are three types of SG5 control cards that can be used in addition to the EXEQ SG5 card. These are: EDIT, Pseudo Monitor, and OMIT cards. All cards follow the MON$$ EXEQ SG5 card, but must be in the following order:

EDIT control cards (if any)
Pseudo Monitor control cards
OMIT control cards (if any)

EDIT Card

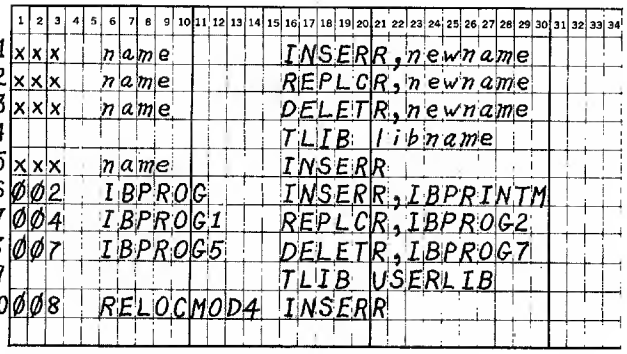
This card is required if: (1) the relocatable module being inserted is to be placed on a system library other than the IBM Library; or (2) if INSER, REPLC, or DELET cards to be generated will not suit the configuration of the user's IBM Relocatable Library. In case 2, the specific cards that might necessitate an edit pass are: Class IV, Format 3 INSER card; Class IV, Format 2 REPLC card; and Class IV, Format 2 DELET card.



• Figure 70. Comments Card

Use of the EDIT cards requires that the EDIT parameter be specified on the EXEQ SG5 card. If EDIT cards are used, they must immediately follow the EXEQ SG5 card.

Lines 1 through 5 of Figure 71 show formats of the EDIT cards. The user must supply one card (or set of cards) for each library control card to be changed. "xxx" is the sequence number of the library control card to be changed. These numbers can be obtained from the listing supplied with the modification tape. The EDIT control cards must be in numerical order according to this sequence number. "name" is the name of the module affected by the library control card. "newname" is the library module name which, when substituted for the intended name, will make the change appropriate for the user's particular configuration.



• Figure 71. EDIT Card Formats and Examples

If the module being inserted should be placed on a system library other than the IBM Library, the set of cards shown in lines 4 and 5 must be used. "libname" is the name of the library in which the module should be placed.

Lines 6 through 10 of Figure 71 show examples of the formats in lines 1 through 5, respectively.

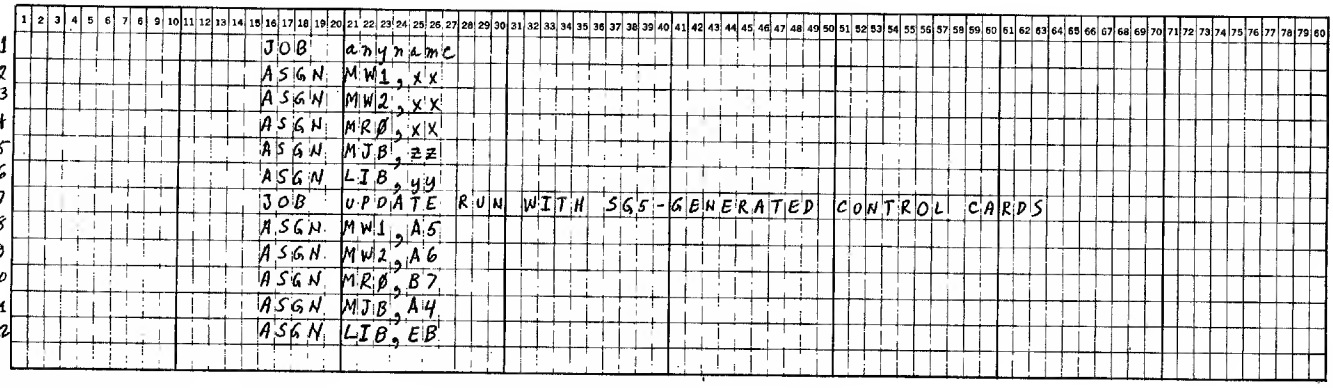
Pseudo Monitor Control Cards

Pseudo Monitor control cards describe to the SG5 program the physical units to be used for the update run. The cards resemble Monitor cards; however, the MONSS must not be placed in columns 6 through 10 of these cards.

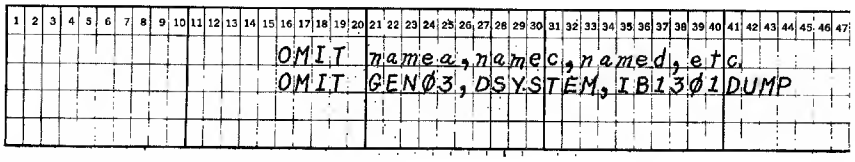
Figure 72 shows the format of the Pseudo Monitor control cards. "anyname" is the name of the job. "xx" is a tape physical unit; "yy" is a disk physical unit. "zz" is a tape or disk physical unit. The cards shown in lines 2 and 4 are for a tape-oriented system only. The card shown in line 5 is for a disk-oriented system only. Examples of the formats in lines 1 through 6 are shown in lines 7 through 10, respectively.

OMIT Card

The OMIT card directs the SG5 program to refrain from making any changes involving the programs indicated in the operand field. This is accomplished through the non-generation of the control card to change or insert the element. The user indicates the control cards he wishes to negate by specifying the Macro patch, Create packet, or Relocatable Library module name as



• Figure 72. Pseudo Monitor Control Cards — Formats and Examples



• Figure 73. OMIT Card Format and Example

an operand of the OMIT card. Any replacement element included on the modification tape, but not on the user's SGF or SOF, is automatically omitted by SG5.

Line 1 of Figure 73 shows the format of the OMIT card. "namca", "namec", and "named" are names of the Macro patches, Create packets, and Relocatable Library modules; these are the changes that the user does not want incorporated. Line 2 is an example of the OMIT card.

Utility Program Control Cards

Utility program control cards act to bring the appropriate utility routine into core storage and/or provide information for that routine. Omitted operands in these cards need not be indicated by commas.

In the Mxy entry, used for many of the utility programs, the symbolic unit specified must be one specified by the user at System Generation. "x" can be R, T, or W (for Reserve, Tele-processing, or Work file, respectively). "y" can be any number from 0 through 9 or any letter from A through Z. An example of the coded entry is MR4.

Storage Print Card

Lines 1 through 3 of Figure 74 show the general formats of the Storage Print (DUMP CORE) control card. In line 1, "xxxxxxxxxx" can be one of three parameters: ALL, for printing all storage writes residing on the Core Image file; LAST, for printing an area of the last storage write residing on the Core Image file; or "name", for printing all or a specified area of all programs called "namc" on the Core Image file. (A storage write consists of the three records written on the Core Image file at Unusual End of Program. These three records serve as input to the Storage Print program.) "start" and "stop" can be: actual addresses calculated from the listings produced by a compiler and the Linkage Loader; the beginning of the dependent program area coded as ORG, the end of the last batch program (SIZ), or the end of core storage minus two (AMS); or any number of positions in either direction from ORG, SIZ, or AMS. The last entry, if used, occupies a nine-position field (e.g., ORG+01000 on line 5).

The formats shown on lines 2 and 3 can be used if the Core Image file was prepared previously, or on another system. It must be mounted on a tape unit assigned to MW0, which must be the second entry on the control card. The letter "U" can be used to cause the unloading of MW0 after the storage print is complete.

Lines 4 through 6 in Figure 74 are examples of the general format shown in line 1. Lines 7 and 8 are examples of the formats shown in lines 2 and 3, respectively.

Tape Print Card

Line 1 of Figure 75 shows the general format of the Tape Print (DUMP TAPE) control card. In line 1, Mxy specifies the symbolic unit from which data is printed. "modc" can be either LOAD or MOVE; if the entry is

Line	Label	Operation	OPERAND
0.1		DUMP	CORE,MDM,xxxxx,start,stop
0.2		DUMP	CORE,MWØ,ALL,U
0.3		DUMP	CORE,MWØ,name,start,stop,U
0.4		DUMP	CORE,MDM,ALL
0.5		DUMP	CORE,MDM,PRGNAME,ORG+Ø1ØØØ,25ØØØ
0.6		DUMP	CORE,MDM,LAST,ORG,SIZ
0.7		DUMP	CORE,MWØ,ALL
0.8		DUMP	CORE,MWØ,PRGNAME,358ØØ,AMS-Ø2ØØØ,U
0.9			

• Figure 74. Storage Print (DUMP CORE) Card — Formats and Examples

Line	Label	Operation	OPERAND
0.1		DUMP	TAPE,Mxy,mode,TLR,RWD,±pxxxxx,ayyyyy
0.2		DUMP	TAPE,MR1,LOAD,TLR,+RØØØ24,RØØØ37
0.3		DUMP	TAPE,MW2,RWD,+TØØØØ2,RØØ5ØØ
0.4		DUMP	TAPE,MR4,RWD
0.5		DUMP	TAPE,MW6,MOVE,+TØØØ25,RØØØØØ
0.6		DUMP	TAPE,MW6,MOVE,+RØ15ØØ,RØØØØ4
0.7			

• Figure 75. Tape Print (DUMP TAPE) Card — Formats and Examples

omitted, Load mode is assumed. TLR is optional and causes the immediate writing of a special trailer record, IEOTBTAPEDUMP. RWD is optional and causes the tape to be rewound to load point before the next operand is processed. "±pxxxxx" specifies the direction, unit of counting, and distance for movement of the tape before printing: "+" is forward, "–" is backward; "p" can be either R (records) or T (tape marks), depending on whether the counting is by records or files; and "xxxxx" is the number of records or tape marks to be passed over. A "–T" combination can never be used. "xxxxx" can be zeros. Omission of the "±pxxxxx" operand has the effect of "+R00000". "qyyyyy" specifies the number (yyyyy) of tape marks (if q = T) or records (if q = R) the program should count before terminating the printout. "yyyyy" can be zeros. Omission of this operand has the effect of "T99999". Lines 2 through 6 are examples of the Tape Print card.

Disk Print Card

Lines 1 and 2 of Figure 76 show the general formats of the Disk Print (DUMP disk) cards. In line 1, "disk" can be 1301 or 1302. Mxy specifies the symbolic unit from which data is printed. "mode" can be either LOAD or MOVE; if the entry is omitted, Load mode is assumed. "+sssss" specifies the number of tracks to be passed over from the beginning of the symbolic unit; printing begins with the track following the last track skipped. Omission of this operand has the effect of "+00000". "ppppp" specifies the number of tracks the program should print. Omission of this operand has the effect of 99999 (i.e., printing continues to the end of the symbolic unit). The optional Gzz parameter indicates that the file to be printed is a Form C file (Sequential-Geometric); "zz" must be two numeric characters, specifying the number of records on each track. Line 2 shows the general format of the Disk Print card for a 1311 print; the format is similar to the 1301/1302 card except that the Gzz 1301/1302 parameter is not used.

Line 3 is an example of a control card for a 1301 disk print. Line 4 shows the control card for a 1311 print.

FORM Card

Lines 1 and 2 of Figure 77 show the general formats of the 1301, 1302, and 1311 Disk Format/Address Generator FORM cards. In line 1, 130x is the type of disk unit used. "x" can be 1 or 2 (i.e., for 1301 or 1302, respectively). Mxy, a required operand, specifies the symbolic unit for which the formatting and addressing functions are performed. "mode" can be either LOAD or MOVE; if the entry is omitted, Load mode is assumed. FMT is an optional parameter specifying the format tracks are to be written. Either this parameter or the "zA" parameter must appear on the card. "zA" indicates the type of addressing to be performed; "z" can be R or H. RA specifies full track with addresses; HA specifies full track with home addresses. If WDC is specified, a Write Disk Check is performed after each write disk operation. "+nnnn" is an optional parameter indicating the number of tracks at the beginning of Mxy that should be passed over before formatting and/or record addressing begins; omission of the entry results in zero being assumed. "mmmm" specifies the number of tracks to be formatted and/or supplied

Line	Label	Operation	OPERAND
0.1		DUMP	disk,Mxy,mode,+sssss,ppppp,Gzz
0.2		DUMP	1311,Mxy,mode,+sssss,ppppp
0.3		DUMP	1301,MR2,MOVE,00465,00025,G02
0.4		DUMP	1311,MW5,+00275,00500
0.5			

• Figure 76. Disk Print (DUMP disk) Card – Formats and Examples

Line	Label	Operation	OPERAND
0.1		FORM	130x,Mxy,mode,FMT,zA,WDC,+nnnn,mmmm,NSTD
0.2		FORM	1311,Mxy,mode,typeop,format,WDC,+mmmmm,nnnn,a,c d
0.3		FORM	1302,MR8,MOVE,FMT,HA,WDC
0.4		FORM	1301,MW3,RA,NSTD,+0004,0426
0.5		FORM	1311,MR4,MOVE,TSA,WDC,+23,09,9,52
0.6			

• Figure 77. IBM 1301, 1302, and 1311 Disk Format/Address Generator FORM Cards – Formats and Examples

with record addresses; if the entry is omitted, the program assumes that the operations should be performed on the whole file or portion of the file not skipped. NSTD indicates that a user's routine is included for generation of nonstandard record addresses.

Line 2 shows the format of the FORM card for the IBM 1311 Disk Format/Address Generator program. The first operand must be 1311. Mxy, a required operand, specifies the symbolic unit on which addressing and/or clearing operations should be performed. "mode" can be either LOAD or MOVE; if the entry is omitted, Load mode is assumed. The "typeop" entry can be one of the following: SEC, for clearing of the data portion of each sector, and no addressing; TSA, for both clearing and addressing of sectors; TRO, for clearing the data portion of each track and leaving the track address unchanged; and TRA, for clearing the data portion of each track and providing a new track address. The "format" entry can be either STD or NSTD, for standard or nonstandard addressing, respectively; if this entry is omitted, standard addressing is assumed. As in line 1, WDC specifies the Write Disk Check option. "+nnnnnn" specifies the number of sectors or tracks to be passed over before addressing and/or clearing begins. If this entry is omitted, the operation(s) start at the beginning of the symbolic unit. "nnnnn" specifies the number of tracks or sectors on which the addressing and/or clearing operations should be performed. If the entry is omitted, the operations are performed on the entire file or the portion of the file not skipped. "a" is a one-character entry signifying the character that should be placed in the cleared areas. If this entry is omitted, BCD blanks are used. The "cd" operand can be used if the addresses to be written on a disk pack will refer to a disk drive other than the one to which they currently refer. This operand can be used only if TSA has been specified as the type-of-operation entry. The two forms of the "cd" operand are as follows: Sn and Rn. In both cases, "n" can be 0, 2, 4, 6, or 8. If Sn is used, "n" indicates the disk drive to which the new addresses refer; the current addresses on the disk pack must correspond to the physical unit to which the pack is assigned. If Rn is used, "n" indicates the disk drive to which the addresses currently on the pack refer; the addresses currently on the pack are restored to the proper addresses for that pack.

Lines 3, 4, and 5 of Figure 77 show examples of FORM cards for the 1302, 1301, and 1311 Disk Format/Address Generator programs, respectively.

HA2 Card

The HA2 card is one of the two additional control cards required for execution of the IBM 1301 or 1302 Disk Format/Address Generator programs. Line 1 of Figure 78 shows the general format of the HA2 card; lines 2, 3, and 4 are examples. As shown in line 1, the HA2 operand (represented as "hh") must be at least two characters and may be as many as 60.

REC Card

The REC card is the second additional control card required for the execution of the IBM 1301 or 1302 Disk Format/Address Generator programs. Figure 79 shows formats and examples of this card. There are two types of REC cards: one for standard and one for nonstandard addressing.

Line 1 illustrates the format of the REC card for standard addressing. The RA2rretc parameter is re-

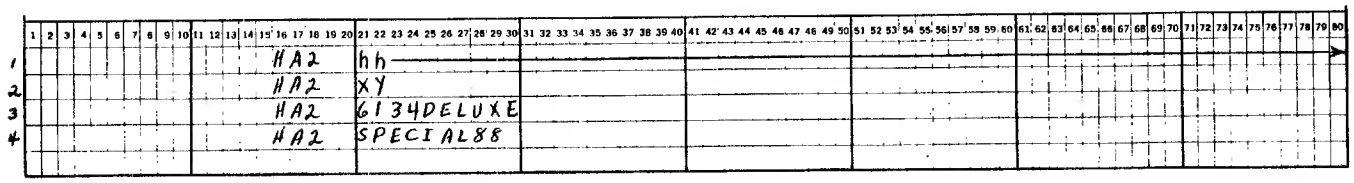


Figure 78. HA2 Card Format and Examples

Line	Label	Operation	OPERAND
0 1		REC	RA2rretc,nnXgggg,P,RA2rretc,nnXgggg,P
0 2		REC	RAØØØØØØetc,nnXgggg,P,RAØØØØØØetc,nnXgggg,P
0 3		REC	RA2ØØ,1ØX2ØØ,Z
0 4		REC	RA2ABCLI,1X5ØØ,F,RA25ØØ33,1ØX1ØØ,RA23J454,3X8Ø
0 5		REC	RAØØØØØØØØØ,3X2ØØ,G,RAØØØØØØØØØ,14X1ØØ,G
0 6			

Figure 79. REC Card Formats and Examples

quired and must contain RA2 as the first three characters. The variable portion, a minimum of two characters, indicates the RA2 portion of the record address; any characters except a comma may be specified. The "nnXgggg" parameter, also required, specifies the number of records (nn) and the length of each record (gggg). A padding character (p) may be included with each pair of RA2rretc and "nnXgggg" parameters. "p" may be any character but a blank or comma. If blank padding is desired, the padding character must be omitted. The RA2rretc and "nnXgggg" parameters, or the two parameters and the padding character, make up one parameter group. Each REC card may contain as many complete groups as will fit on the card.

Line 2 shows the format of the REC card for nonstandard addressing. (To utilize this card, the user must have specified NSTD on the FORM card.) The format is the same as that of the standard REC card, with one exception: the first entry of the parameter group is RA000000etc, where the number of zeros indicates the number of characters in the address. There must be a minimum of six zeros.

Lines 3 and 4 in Figure 79 are examples of REC cards for standard addresses. Line 5 shows a REC card for nonstandard addresses.

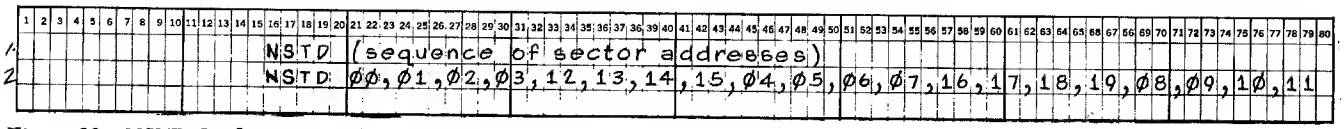
NSTD Card

Figure 80 shows the IBM 1311 Format/Address Generator NSTD card. If the user specifies NSTD as the "format" entry on the IBM 1311 Format/Address Generator FORM card, an NSTD card must immediately follow the FORM card. The format of the NSTD card is shown on line 1. The sector addresses can be in any order, and all twenty sectors must be specified on the same card. Line 2 is an example of the NSTD card.

SAVE Card

Figure 81 contains SAVE control card formats and examples. The SAVE card is used to execute the File Save program, which can record the contents of either: (1) a symbolic 1301 or 1302 unit, or part of the symbolic unit; or (2) part or all of one or more 1301 or 1302 disk surfaces.

Line 1 shows the format of the SAVE card. The "x" in 130x can be either 1 or 2 (for 1301 or 1302, respectively). The "symunit" entry can be either Mxy or the "camtttt" start address. If "camtttt" is specified, the disk-surface type of operation is used. "c" is the channel, "a" specifies the access arm, "m" is the module, and "tttt" is the track number. "tttt" must be the address of the outermost track of the disk surface. The "mode" entry can be either LOAD or MOVE; if the entry is omitted, Load mode is assumed. If the optional PUNCH parameter is specified, the File Save program places its output on the SPU in Load-card format. If the parameter is omitted, output is written on MW2. "+xxxx" is the number of tracks to be skipped before transfer of data starts. If this parameter is omitted, data transfer starts from the beginning of the symbolic unit, or outermost track of the disk surface. Syyyy specifies the number of tracks to be saved. If this parameter is omitted, the program continues the transfer of data to the end of the symbolic unit or disk surface. Gzz, also an optional parameter, indicates that the file to be saved is an IOCS Form C file and may be partitioned. "zz" indicates the number of records per track. The Gzz parameter has no significance with a disk-surface type of save.

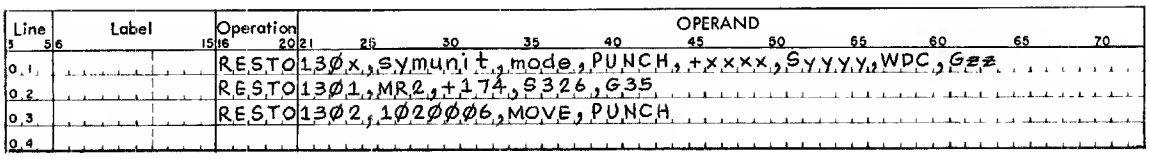


• Figure 80. NSTD Card Format and Example

Date _____

Line	Label	Operation	OPERAND
0 1		SAVE	13Øx,symunit,mode,PUNCH,+xxxx,Syyyy,Gzz
0 2			camtttt,+xxxx,Syyyy
0 3		SAVE	13Ø1,1Ø2ØØØ5,+22,S125
0 4			1Ø2ØØØ8,+12,S48
0 5		SAVE	13Ø2,MR3,MOVE,PUNCH,GØ9
0 6			

• Figure 81. SAVE Card Formats and Examples



• Figure 82. RESTO Card Format and Examples

Line 2 shows the format of a card used for saving additional disk surfaces. This card must immediately follow the SAVE card; the label and operation fields must be blank. As in the SAVE card, "camtttt" represents the start address of the disk surface, "+xxxx" the number of tracks to be skipped, and Syyyy the number of tracks to be saved. The last two entries on the card are optional.

Line 3 is an example of a disk-surface type of save operation for data on a 1301 unit. Line 4 illustrates the optional card for saving an additional disk surface. Line 5 illustrates a card to save data on a 1302 unit and places the output on the SPU as well as MW2.

RESTO Card

Figure 82 shows formats and examples of the RESTO card. The RESTO card is used to execute the File Restore program, which restores data recorded by the File Save program.

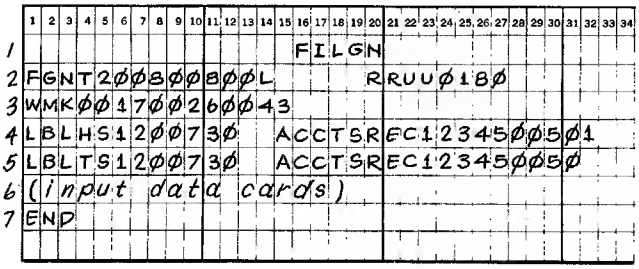
Line 1 shows the format of the RESTO card. The first parameter specifies the type of disk unit to which the file is restored. "x" can be 1 or 2 (for 1301 and 1302, respectively). "symunit" can be either the symbolic unit to which data is restored, or the "camtttt" start address for a disk-surface restore. "mode" can be LOAD or MOVE; if the parameter is omitted, Load mode is assumed. The optional PUNCH parameter enables the user to read cards in Load-card format from the SIU. If this parameter is omitted, the program assumes that the file to be restored resides on tape unit MW2. "+xxxx" is the number of records skipped on MW2. Syyyy specifies the number of records to be restored from MW2. WDC indicates that a Write Disk Check should be performed after each write disk operation. The Gzz parameter indicates that the file to be restored is an IOCS Form C file and may be partitioned; "zz" is the number of records per track in the file. If the Gzz parameter was specified on the SAVE control card, the parameter on the RESTO card must be exactly the same.

Lines 2 and 3 of Figure 82 are examples of the RESTO card.

Data File Generator Cards

There are several types of cards that can be used in the Data File Generator program. These are: the FILGN card, to execute the program; the FGN card, to provide the bulk of the information on the file to be generated; the WMK card, to indicate where word marks should be placed (if Form 2 records in Load mode are generated); 14 different LBL cards, for providing tape-label information; the RLS card, for executing the IOCTL RELSE, OUTPUT, FILE macro-instruction; the EOR card, for executing the IOCTL FEOR, OUTPUT, FILE macro-instruction; the EOF card, for causing the program to close the file generated and prepare to process the next set of control and data cards (input card set) for the next file to be generated; and the END card, to terminate execution of the program. The formats of these cards are described in detail in the publication *IBM 1410/7010 Operating System; Utility Programs,* Form C28-0353.

The program generates a file for each input card set. An example of the cards that might be included in an input card set is shown in Figure 83.



• Figure 83. Example of an Input Card Set for the Data File Generator Program

RDLIN Cards

Figure 84 shows formats and examples of the RDLIN control cards for the IBM 1311 Disk Label program. The routine is brought into core storage and executed through an EXEQ LABEL1311 card. RDLIN cards, placed after the EXEQ LABEL1311 card, provide information on the function to be performed. Line 1 illustrates the format of the NEW RDLIN card. This card serves to set up a header-label track on the last track of the pack (addresses 0x9980 through 0x9999, where "x" is an odd number corresponding to the range of addresses on the pack); the addresses are altered to 000180 through 000199. This is to prevent unintentional de-

struction of the labels. The card also fills all 20 sectors with blanks, and enters the header label identifier and pack serial number in each of the sectors. The "n" in column 5 can be 0, 2, 4, 6, or 8, to indicate the current range of addresses on the disk pack. Mxy is the symbolic unit to which the pack is assigned. "ppppp" is the pack serial number.

Line 2 shows the Restore Normal Addresses (RNA RDLIN) card. This card restores the addresses 0x9980 through 0x9999 to the label track. The ENTR RDLIN card shown on line 3 is used for entering a new label on an established label track. "nn" is the two-digit number specifying the position in the label track (00-18) in which the label should be entered. "rrrr" is the file retention period, "ccccc" is the creation date, "fffffffff" is the file identification, "sssss" is the file serial number, "qqqqq" is the file sequence number, "lllll" is the sector address of the first sector of the file identified by this label, and "uuuuu" is the sector address of the last sector of the file. The formats of the DELT RDLIN (Deleting a Label) and CHNG RDLIN (Changing a Label) cards are similar to that of the ENTR card. Line 6 shows the format of the PRNT RDLIN (Printing Labels) card. If ALL is specified in columns 21-23, the program prints all labels on the disk pack. If the file identification is specified in columns 30-39, the program prints the label whose file identification field matches the identifier in columns 30-39. If a label number is specified in columns 14-15, the program prints that label. If more than one option is specified or the program cannot determine which option is desired, it prints all labels.

Examples of the NEW, RNA, ENTR, DELT, CHNG, and PRNT RDLIN cards are shown in lines 7 through 12, respectively.

Generalized Tape Sorting Program Control Cards

Tape Sort Definition Control Cards

Lines 1 through 3 of Figure 85 show the formats of the tape Sort Definition and Unit Definition control cards. Both the Sort Definition (DSORT) and Unit Definition (DUNIT) cards are required for the execution of the tape Sort Definition Program.

Columns 6 through 15 of the DSORT card (see line 1) contain the name by which the sort or merge program produced will be identified. Columns 16 through 20 contain the mnemonic DSORT. The operands in columns 21 through 72 can be in any order. Parameter analysis terminates with the first blank character in this field. If the operand can be chosen from a pair of alternatives, omission of the operand signifies that the first of the pair is desired. Alternative operands of the DSORT can be as follows: "pgmtype" can be SORT or

Line	Cols 1-10	Cols 11-15	Cols 16-20	Cols 21-30	Cols 31-40	Cols 41-50	Cols 51-60	Cols 61-67
1	NEWn	Mxy	RDLIN			ppppp		
2	RNAn	Mxy	RDLIN			ppppp		
3	ENTR	Mxynn	RDLIN	rrrrcccccf	fffffffffs	ssssppppp	qqqqllllll	uuuuuu
4	DELT	Mxynn	RDLIN	rrrrcccccf	fffffffffs	ssssppppp	qqqqllllll	uuuuuu
5	CHNG	Mxynn	RDLIN	rrrrcccccf	fffffffffs	ssssppppp	qqqqllllll	uuuuuu
6	PRNT	Mxynn	RDLIN	ALL f	fffffffff			
7	NEW6	MR2	RDLIN			13579		
8	RNA4	MW4	RDLIN			13579		
9	ENTR	MR115	RDLIN	999964246I	PAYROLL-2Ø	163513579	ØØØ7Ø21ØØØ	Ø27ØØØ
10	DELT	MW3Ø8	RDLIN	Ø365 I	ACCTSPYBL			
11	CHNG	MW417	RDLIN	Ø73Ø I	ACCTSRECL			ØØ48ØØ
12	PRNT	MW2	RDLIN	ALL				

• Figure 84. Control Cards for the IBM 1311 Disk Label Program — Formats and Examples

Line	Label	Operation	OPERAND
01	progrmname	DSORT	pgmtype,rcdtype,amtct,flds,usermod,PCH
02		DUNIT	Mxy,Mxz,Mxa
03		DUNIT	Mxy,Mxz,...,Mxn
04	PROGA	DSORT	SORT,VARIABLE,MUL,PCH
05		DUNIT	MR1,MR2,MR3
06		DSORT	MERGE,MOD
07		DUNIT	MRA,MR1,MR2,MR3
08			

• Figure 85. Tapes Sort Definition and Unit Definition Control Cards — Formats and Examples

MERGE; "rcdtype" can be FIXED or VARIA; "amtctlflds" can bc MULTI or ONE; "usermod" can be UNMOD or MOD. Specification of PCH results in the writing of the definition statements for the program on the SPU as well as on MW2. The parameters can be reduced to their first three characters or expanded to up to ten characters. For example, VARIA can also be coded as VAR, VARIABLE, VARYING, VARIABLXYZ, etc.

The format for a Unit Definition card for a sort is different from that for a merge. As shown in linc 2 of Figurc 85, the first parameter (Mxy) in the sort DUNIT card is the symbolic unit for thc sort input file. The sccond parameter (Mxz) is the symbolic unit for thc first set of merge tapes. The third parameter (Mxa) is the symbolic unit for the second set of merge tapes.

The format for the DUNIT card for a merge is shown in the third line of Figure 85. In this case, the first parameter (Mxy) is the symbolic unit for thc merge output file. The remaining parameters each designate an input file to the merge. One to eight parameters (in addition to Mxy) can be specified.

Lines 4 and 5 of Figure 85 contain examples of the DSORT and the DUNIT card for a sort; lines 6 and 7 constitute an example of the card pair for a merge.

Tape Sort or Merge Program Control Cards

Lines 1 through 5 of Figure 86 show the formats of the sort or merge program control eards. These cards provide information for the sort or merge program to be executed, and follow the EXEQ card for that program. At least one SORTTYPE card, one INPUTFILE eard, one OUTPUTFILE card, and one CNTLFLDS card must be includcd. The LABELDES card is optional. Parameters for the operand fields (see *IBM 1410/7010 Operating System; Generalized Tape Sorting Program,* Form C28-0354) can be abbreviated to the first three charaeters or expanded to ten charaeters. Column 72 must be blank. Examples of these control cards appear in lines 6 through 13.

Generalized Disk Sorting Program Control Cards

Disk Sort Definition Control Cards

Figure 87 shows the fonnats and examples of the disk Sort Definition and Unit Definition eards. Both the Sort Dcfinition (DSORT) and Unit Definition (DUNIT) cards are required for the execution of the disk Sort Definition program.

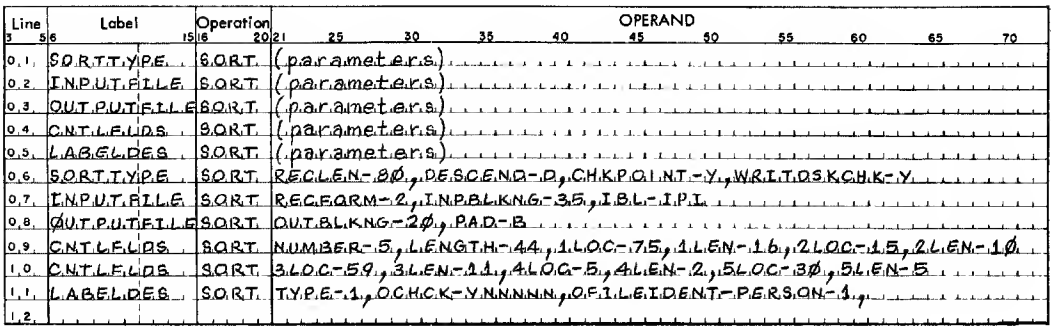
Line 1 shows the format of the disk DSORT card. "Progrmname" is the name by which the sort program produeed will be identified. Columns 16 through 20 contain thc mnemonic DSORT. Thc operands in eolumns 21 through 72 can be in any order. Parameter analy-

Line	Label	Operation	OPERAND
0.1	SORTTYPE	SORT	(parameters)
0.2	INPUTFILE	SORT	(parameters)
0.3	OUTPUTFILE	SORT	(parameters)
0.4	CNTLFLDS	SORT	(parameters)
0.5	LABELDES	SORT	(parameters)
0.6	SORTTYPE	SORT	RECLEN-8Ø,MERGEORD-5,CHK-Y,1SIZMOD-1ØØ24,3SIZ-12736
0.7	SORTTYPE	SORT	CNSLMSG-Y
0.8	INPUTFILE	SORT	RECFORM-2,INP-2Ø,REELCNT-99
0.9	OUTPUTFILE	SORT	OUTBLKNG-35,PAD-2
1.0	CNTLFLDS	SORT	NUMBER-2,LENGTH-19,1LOC-1Ø,1LEN-6,2LOC-48,2LEN-13
1.1	LABELDES	SORT	TYPE-2,ICHCK-NYYYYY,ICR-64175,IFI-1NVNTCTL-2
1.2	LABELDES	SORT	ISE-73526,IRE-ØØØ1,OCHK-YNNNNN,ORT-ØØ6Ø,OCR-64236
1.3	LABELDES	SORT	OFI-INVNTCTL-3,OSE-73586,ORE-ØØØ1
1.4			

• Figure 86. Generalized Tape Sorting Program — Program Operation Control Card Format and Example

Line	Label	Operation	OPERAND
0.1	progrmname	DSORT	inmedium,outmedium,rcdtype,amtctlflds,usermod,PCH
0.2		DUNIT	Mxy,Mxz,Mxa,Mxb
0.3	DISKSORTA	DSORT	VARIABLE,MUL,OTDISK,PCH
0.4		DUNIT	MR1,MR4,MR2,MR3
0.5			

• Figure 87. Disk Sort Definition and Unit Definition Cards — Formats and Examples



• Figure 88. Generalized Disk Sorting Program Control Cards — Formats and Examples

sis terminates with the first blank character in this field. As in the case of the tape Sort Definition program, omission of both possible alternatives of an operand indicates that the first alternative is desired. Alternative operands of the disk DSORT card are as follows: "inmedium" can be INTAPE or INDISK; "outmedium" can be OTTAPE or OTDISK; "rcdtype" can be FIXED or VARIA; "amtctlflds" can be MULTI or ONE; "usermod" can be UNMOD or MOD. Specification of PCII results in the writing of the defined program on the SPU as well as on MW2. The paramcters can be expanded to ten characters or reduced to the first three characters.

Line 2 of Figure 87 shows the format of the disk Unit Definition card. The first paramcter (Mxy) designates the symbolic unit for the sort input file. The second parameter designates the symbolic unit for the output file. The third and fourth parameters designate the symbolic units for disk work areas A and B, respectively (two disk work areas are required for execution of the program). Lines 3 and 4 of Figure 87 are examples of the DSORT and DUNIT disk Sort Definition card pair.

Disk Sort Program Control Cards

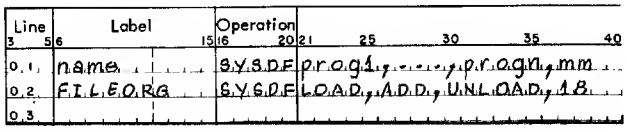
The formats of the disk sort program control cards are similar to those for the tape sort cards. However, the disk sort cards do not require a blank in column 72. At least one SORTTYPE card, one INPUTFILE card, one OUTPUTFILE card, and one CNTLFLDS card must be included. The LABELDES card is optional and can be used if the input and/or output file is on tape. Paramcters for the operand fields of these cards (see *IBM 1410/7010 Operating System; Generalized Sorting Program Using IBM 1301/1302 Disk Storage,* Form C28-0404) can be reduced to the first three characters or expanded to ten characters.

Lines 1 through 5 of Figure 88 show the formats for the disk sort cards; lines 6 through 11 contain examples of the cards.

File Organization System Control Cards

System Definition Control Cards

The format of the System Definition (SYSDF) control card for the File Organization System is shown in line 1 of Figure 89. Columns 6 through 15 contain the user-given name of the program. This is the name used when the defined program is executed (i.e., the first parameter of the EXEQ card). The name may be one to ten alphameric characters, left-justified in the field. Columns 16-20 contain the mnemonic SYSDF. The possible File Organization System phase parameters (progl, . . . , progn) are LOAD, ADD, and UNLOAD; one to three of these parameters can be specified. "mm" is the number of tracks allocated for the File Directory and Index area. Line 2 of Figure 89 shows an example of the SYSDF card.

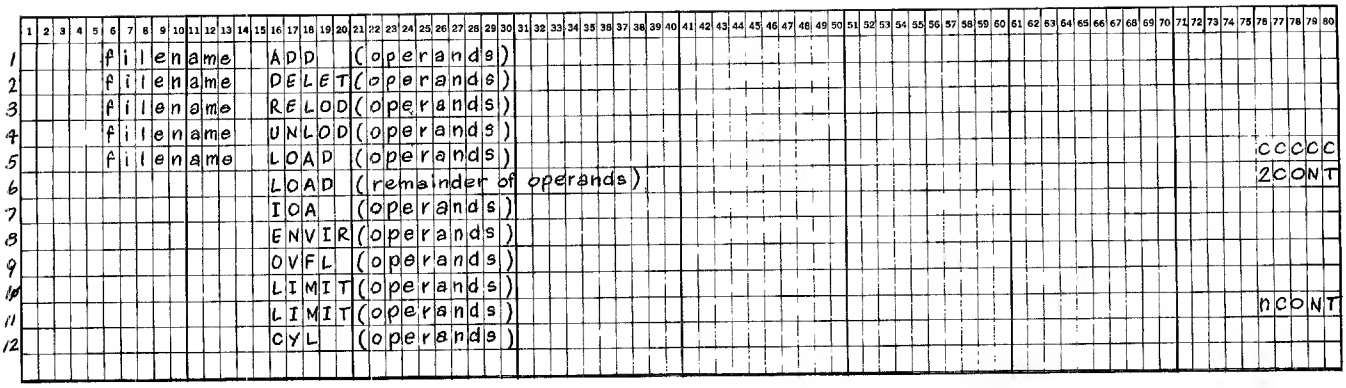


• Figure 89. File Organization System — System Definition Control Card Format and Example

File Organization Program Operation Control Cards

General formats of the program operation control cards for the File Organization System are shown in Figure 90. Lines 1 through 5 illustrate the formats for the five main types of File Information cards. "filename" is the name of the data file to be acted upon, and can consist of from one to ten characters.

The File Information LOAD card, shown on line 5, may be followed by a continuation card. If no continuation card is used, "ccccc" in the LOAD card is blank. If a continuation card is used, "ccccc" must be 1CONT; in this case, a comma must follow the last operand in the LOAD card, and that operand must be complete. The format of the continuation card is shown in line 6; 2CONT must be placed in columns 76 through 80.



• Figure 90. File Organization System — Program Operation Control Card Formats

Line	Label	Operation	OPERAND
0,1	MON$,$	COMT	LOAD DATA FILE WIDGET
0,2	MON$,$	EXEQ	FILEORG
0,3	WIDGET	LOAD	ØØØ1,$,%,,,3,ØØ1Ø,Ø5,ØØ3Ø,Ø3,ØØ2Ø,Ø2
0,4		IOA	IPI,Ø1ØØ,1,M,U
0,5		IOA	MW2,2ØØØ,2,L,B
0,6		ENVIR	13Ø1,,2Ø,39,Ø6,Ø4ØØ,Ø1ØØ,M,2,W
0,7		OVFL	MW3,,1Ø2ØØØØ,2Ø5,1Ø,12ØØ11,2Ø5
0,8		CYL	1ØØØØØ,199,ØØ
0,9		CYL	1Ø1ØØØ,199,11,15,Ø3
1,0	MON$,$	JOB	NEXT
1,1			

• Figure 91. File Organization System — Program Operation Control Card Examples

The general formats of the Input/Output Assignment card, the Environment card, the Overflow card, the Limits card, the Limits continuation card ("n" is the continuation card sequence number), and the Cylinder card are shown in lines 7 through 12, respectively. The parameters that can be entered in the operand fields for each of the program operation cards are described in the publication *IBM 1410/7010 Operating System; File Organization System for IBM 1301/1302 Disk Storage*, Form C28-0405.

Figure 91 is an example of the control cards needed to perform a function. Lines 3 through 9 illustrate some of the program operation cards mentioned above. The function performed in this case is the loading of a data file with two types of tape records.

Macro Print and Punch Program Control Card

Line 1 of Figure 92 shows the format for the PRINT control card for the Macro Print and Punch Program. This card must immediately follow the EXEQ MACROPRT card. If the program is to list the name of each macro routine, HEADER must be specified in columns 6 through 11. The parameter applies only for printed output and, if used, should appear only on the first PRINT card.

The operand field specifies which macro routines are to be completely printed and/or punched, and whether or not cross referencing is to be made. (The user specifies in the EXEQ MACROPRT card whether printing and/or punching should be performed.) CROSS, if entered, must be the first parameter on the PRINT card. It directs the program to indicate the page and line number of every reference to "L" characters (one-character label in column 6 of the Library Coding Form) in the model statements. If all macro routines in the Macro Library are to be printed. ALL must be specified. If used, it must be the first or second (if CROSS is specified) operand. If ALL is specified, the program assumes that no additional operands follow. If ALL is not specified, the user must include one or more of the additional operands shown in line 4.

Line	Label	Operation	OPERAND
0.1	HEADER	PRINT	CROSS,ALL,START-namea,namec,namef-nameh,namej-END
0.2	HEADER	PRINT	CROSS,START-MACRA,MACRC,MACRF-MACRH,MACRJ-END
0.3	HEADER	PRINT	ALL
0.4			

• Figure 92. PRINT Card Format and Examples

START-namea indicates that all macro routines from the beginning of the library to "namea" should be printed and/or punched. "namec" indicates that only "namec" should be printed and/or punched. "namef-nameh" specifies that all macro routines starting with "namef" up to and including "nameh" should be printed and/or punched. "namej-END" indicates that all macro routines starting with "namej" up to the end of the library should be printed and/or punched. Lines 2 and 3 are examples of the PRINT control card.

The following pages list the messages written on the console printer by IBM-provided programs within the Operating System. It is suggested that a similar list of messages be compiled for the installation-written programs and appended to this section.

The first group of messages, listed in alphabetic then numeric order, are issued or may be issued when the Initialization routine is being executed. The second group, listed in alphabetic order, consists of informational messages issued by the system.

The remainder of the messages are listed in numeric order (based on the five-digit code number preceding each of them).

Each message description in these lists contains an explanation of the message and the action that can be taken. Unless otherwise indicated, the procedures indicated under "Action" are those steps which the operator can or must take. In cases where the corrective action indicated will probably have to be taken by the programmer or analyst, the "action" statement is prefaced by the words, "The user must . . ."

In the representation of each message in these lists, a number, capital letter, or special character indicates the character actually printed out. A lower-case letter (e.g., n, x) indicates that one of several characters might appear in that position, depending on the specific situation. The meaning of the characters that might appear is explained in the "Explanation" section for each message. Lower case letters in parentheses indicate that a wide range of letters and combinations of letters may appear; the words formed by the lower-case letters describe the meaning of the information that will be provided. For example, "(control card in error)" signifies that the contents of the control card in error are printed out.

Initialization Messages

The following messages can appear only during initialization procedures. They are given by the Initialization routine, which functions during Initialization, reinitialization, and restarting from checkpoints. Some of the messages are requests for information from the console, others are indications of difficulties that prevent continuation of processing. The latter are followed by dead-end loops (to permit a Tele-processing system interrupt, if possible). The messages are in alphabetic order. The explanations assume knowledge of the information in the "Initialization and Reinitialization" and "Restarting from a Checkpoint" sections.

BOOTSTRAP ERROR 01
Explanation: Bootstrap routine, in a tape system, has found a header record rather than an execute record after the Resident Monitor record on the System Operating File. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

BOOTSTRAP ERROR 02
Explanation: A tape read error, other than wrong-length record, persists after re-reading nine times. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

BOOTSTRAP ERROR 03
Explanation: A tape read error occurred while the Bootstrap routine was trying to read a header record. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

BOOTSTRAP ERROR 04
Explanation: The first record after the Bootstrap routine is not a header record. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

BOOTSTRAP ERROR 05
Explanation: The instruction loaded by the Bootstrap routine into location 00000 is not valid because it does not contain a non-overlap character in location 00002. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

BOOTSTRAP ERROR 06
Explanation: A disk read error persists after re-reading five times. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

BOOTSTRAP ERROR 07
Explanation: The Bootstrap routine has found an unidentifiable record while loading the Resident Monitor. The Bootstrap routine has entered a waiting loop.
Action: Begin bootstrap again.

DATE NOT ENTERED
Explanation: The first JOB card has been read, but no DATE card has been processed.
Action:
1. Press INQUIRY REQUEST.
2. Enter five-character date.
3. Press INQUIRY RELEASE.

ENTER ASGN FOR MDM
Explanation: The Initialization routine is ready to accept physical unit symbol for the MDM.
Action:
1. Press INQUIRY REQUEST.
2. Enter two-position physical unit symbols for the MDM.
3. Press INQUIRY RELEASE.

ENTER ASGN FOR MDM AND MDT
Explanation: The Initialization routine is ready to accept physical unit symbols for the MDM and MDT.

Action:
1. Press INQUIRY REQUEST.
2. Enter two-position physical unit symbols for MDM and MDT, respectively (e.g., A6B5).
3. Press INQUIRY RELEASE.

ENTER DATE, I/O ASSIGNMENTS, JOB NUMBERS

Explanation: The Initialization routine is ready to accept initialization information. (This message is given only during reinitialization *without* rewind.)
Action:
1. Press INQUIRY REQUEST.
2. Enter five-character date.
3. Press INQUIRY RELEASE.
4. Wait for next message from Bootstrap, which should be "IO OR JN".

ENTER JOB NUMBERS

Explanation: The Initialization routine is ready to accept job numbers for the Standard or Alternate Input Unit. (This message is given only during reinitialization *with* rewind.)
Action:
1. Press INQUIRY REQUEST.
2. Enter two-character job numbers (Standard Input Unit first). If Alternate Input Unit is not included in installation or was not assigned at the time the need for reinitialization arose, enter two blank characters for the Alternate Input Unit job count. (A total of four characters *must* be entered.)
3. Press INQUIRY RELEASE.

ENTER RST NUMBER

Explanation: The Initialization routine is ready to accept the number of the checkpoint that is to be used for the restart.
Action:
1. Press INQUIRY REQUEST.
2. Enter four-character checkpoint number (i.e., 012C).
3. Press INQUIRY RELEASE.

ENTER SOF/SIU ASGN SYMB

Explanation: The Initialization routine is ready to accept the assignment symbols for the System Operating File and the Standard Input Unit. (This message is given only when a word mark has been entered into location 00000.)
Action:
1. Press INQUIRY REQUEST.
2. Enter assignment symbols for System Operating File *and* Standard Input Unit. Both must be entered, even if only one assignment is being changed. System Operating File symbol must precede Standard Input Unit symbol.
3. Press INQUIRY RELEASE.

EOF SIU/AIU IN INIT

Explanation: The Initialization routine has encountered an end of file on either the Standard or Alternate Input Unit.
Action: Start over with the proper input on the unit.

INIT ASGN EXCEED TABLE

Explanation: The Initialization routine for a disk system has been given more initial assignments than can be stored in the table it is building for reinitialization. (Because the table will accommodate up to 150 assignments, this message is not normally expected.)
Action: Start over with fewer ASGN cards preceding the first JOB card.

(ASGN Card Image) INVALID ASSIGNMENT

Explanation: The Initialization routine has read an ASGN card that cannot be processed. (The ASGN card could be constructed internally from an assignment entered through the console.)
Action:
1. Press INQUIRY REQUEST.
2. Enter a five-character assignment (e.g., MDMA1).
3. Press INQUIRY RELEASE.

INV INITIAL CHAR

Explanation: The character at location 00000 is not a valid initialization status character. (That is, it is not an A, B, C, or D.)
Action: Start over with a valid initialization status character.

IO OR JN

Explanation: The Initialization routine is ready to accept input/output assignments or job numbers. (This message is given only during reinitialization *without* rewind.) The first time "IO OR JN" appears during reinitialization, it indicates the date has just been processed. Each successive time the message appears, it indicates that the assignment just entered through the console has been processed; the Initialization routine is ready to accept the next assignment or, if all assignments have been given, the job numbers for the Standard and Alternate Input units.
Action:
1. Press INQUIRY REQUEST.
2. Enter a five-character assignment (e.g., MDMA1) or, if all assignments have been entered, enter two-character job numbers (Standard Input Unit first). If Alternate Input Unit is not included in installation or was not assigned at the time the need for reinitialization arose, enter two blank characters for the Alternate Input Unit job number. (A total of four characters *must* be entered.)
3. Press INQUIRY RELEASE.
   NOTE: An INQUIRY REQUEST and INQUIRY RELEASE must precede and follow each five-character assignment entry and the four-character job numbers entry.

IO OR JN RE ENTER XXX

Explanation: This message is given to permit the operator to correct an invalid assignment or to cancel the assignment by entering the job numbers for the Standard and Alternate Input Units.
Action:
1. Press INQUIRY REQUEST.
2. Enter five-character assignment (e.g., MR1A2) or two 2-character job numbers (e.g., 04bb).
3. Press INQUIRY RELEASE.

JOB SEARCH OUT OF STEP

Explanation: Something has caused the Initialization routine to search past the job count entered. (This message is given only during reinitialization with rewind.)
Action: Begin reinitialization again.

MUST ENTER SOF/SIU ASGN SYMB

Explanation: The System Operating File is on a unit different from the one specified at System Generation, but operator did not enter a word mark at location 00000 to request a change of assignment.
Action:
1. Press INQUIRY REQUEST.
2. Enter current assignments for both the System Operating File and Standard Input Unit. Enter the two-character assignment symbol for the System Operating File first, immediately followed by a symbol for Standard Input Unit. (Total entry is four characters; e.g., A1C7.)
3. Press INQUIRY RELEASE.

RD ERR TM

Explanation: A permanent read error occurs while the Resident Monitor is trying to read in Transitional Monitor from disk.

Action: Reload SOF on disk.

SHARE VIOLATION, MONITOR COMPILATION

Explanation: At System Generation, the rules concerning the assignment of System files were violated. This violation is detected during the first initialization of the System Operating File containing the invalid assignments.

Action: None. A new System Operating File must be generated to correct the invalid assignment(s).

**SEQ ERR* (columns 16 through 72 of card)

Explanation: A card other than Monitor DATE or ASGN card was found during initialization before the first JOB card. The contents of the card from column 16 through 72 are included in the message.

Action: None.

00202

Explanation: A tape read error, other than wrong-length record, occurred while the Bootstrap 2 routine was being read. The computer has halted.

Action: Begin bootstrap again.

00438

Explanation: The instruction loaded by the Bootstrap routine into location 00000 is not valid because it does not contain a non-overlap character for any channel in location 00002. The computer has halted.

Action: Begin bootstrap again.

System Informational Messages

The following messages (listed in alphabetic order) are given by the system. Some of the messages occur during normal operation of the system (for example, END SIU); others occur because of error conditions that cannot be corrected. In either case, the messages are not accompanied by waiting loops for operator action.

ANOTHER CYLINDER CARD NEEDED

Explanation: The data area available to the Load phase of the File Organization System was exhausted before the function was completed.

Action: No operator action is possible. The user can provide one or more additional CYL cards to the Load phase control-card deck and re-execute the program.

ASGN ALT OP INVALID nn

Explanation: ASGN card alternate operand is invalid. System Monitor rejects assignment and enters the Unusual-End-of-Program routine. "nn" is the number of ASGN card alternate operand that was invalid.

Action: Correct the invalid assignment and restart.

ASGN MCO OP INVALID (warning message)

Explanation: The ASGN MCO card contains an alternate operand which is ignored.

Action: None by the operator.

ASGN MJB OP INVALID (warning message)

Explanation: The ASGN MJB card contains an alternate operand which is ignored.

Action: None by the operator.

ASGN OP INVALID xnn

Explanation: The ASGN card operand indicated by "nn" is invalid. The System Monitor rejects the assignment and enters the Unusual-End-of-Program routine. The nature of the error, as indicated by the "x" character, is as follows:

If "x" is a blank: Either a symbolic unit or a physical unit could not be located in the Resident Monitor's assignment tables.

If "x" is a 4: Sequence rules for sharing physical units were violated. (For example, if MW2,A1,A2 is a current assignment, then MW5,A2,A3 cannot be made.)

If "x" is an 8: Rules (other than sequence rules) for sharing physical units were violated. (For example, the physical unit used by the Standard Input Unit cannot be assigned to another symbolic unit.)

If "x" is a T: An attempt was made to assign a Teleprocessing system file when the TP complex was open.

Action: No operator action is required by the system unless this message is followed by the "(ASGN card image) INVALID ASSIGNMENT" message. If the latter message does follow, the action indicated for that message should be taken (see the "Initialization Messages" section).

BATCH DUMP

Explanation: The TP Supervisor has put the dependent program on tape to process an interrupt. Therefore, class B messages cannot be processed.

Action: Do not enter any class B messages until a "RESTORE" message is typed.

BOOTSTRAPS (card image of Bootstrap routine) 1410 BOOT (card image of Bootstrap routine) 7010 BOOT

Explanation: This message, produced by the System Generator Disk Loader program, gives the card image of the Bootstrap 1 routine for both the 1410 and 7010 to retrieve the first record from disk.

Action: The operator should punch the card for his machine and use it as the Bootstrap 1 routine for initialization.

CARD IN ERROR

Explanation: The Macro Library Print program has detected an error in its control card, preventing execution of the print. An image of the card in error has been written on the Standard Print Unit and control returned to the Monitor.

Action: None.

COMT (contents of COMT card columns 21 to last significant character before column 72)

Explanation: This message indicates that a Monitor COMT card has been read.

Action: None, unless card contents request action.

CONTROL CARDS IN ERROR

Explanation: The Control phase of the File Organization System completed its execution, but a control-card error was found. (This console message appears once for each series of control cards found to be in error.) The Control phase has analyzed all control cards for the phase. Program control returns to the System Monitor. Thus, no file organization occurs, no alteration is made to the data file, and no waiting loop is entered.

Action: No operator action is possible. The System Monitor skips to the next job. The user must refer to the SPR diagnostic message, analyze the problem, correct the control cards in error, and re-execute the program.

CONTROL CARDS MUST BE SUPPLIED

Explanation: On attempting to read the first file-information card, the Control phase of the File Organization System received an SIU end-of-file indication.

Action: The control-card deck must be supplied and the program re-executed.

END AIU

Explanation: END card or end of file has occurred on the Alternate Input Unit.

Action: None for this message. ("ENTER B MESSAGES" will follow.)

END SIU

Explanation: END card or end of file has occurred on the Standard Input Unit.

Action: None for this message. ("ENTER B MESSAGES" will follow.)

END RST

Explanation: The restart has been effected and the dependent program is now being executed.

Action: None required.

ENTER B MESSAGES

Explanation: The Transitional Monitor is ready to accept class B console inquiries from the operator.

Action:

1. Press INQUIRY REQUEST.
   NOTE: If user option to include a HALT in Wait-Loop Routine was specified, operator must now press START.
2. Enter console inquiry. (Class A messages are also acceptable at this time.)
3. Press INQUIRY RELEASE.
   NOTE: The above sequence is repeated for each console inquiry. The last inquiry must be $BX to cause normal processing to resume.

FILE NOT FOUND

Explanation: The Add phase of the File Organization System searched the File Directory but could not find the file name given in columns 6-15 of the file information card.

Action: No operator action is possible. The user should check columns 6-15 of the file information card to be sure that the name is given correctly. If the file name is correct, the user must alter the control card sequence or provide additional Load function control cards so that the file is loaded before the Add function is executed.

INPUT AREA REQUIREMENTS EXCEED CORE CAPACITY

Explanation: In attempting to assign core storage input areas for execution of the Load or Reload program, the Load phase of the File Organization System determined that available core storage capacity would be exceeded.

Action: No operator action is possible. The user must modify the input presentation as outlined in Appendix A of the publication *IBM 1410/7010 Operating System; File Organization System for IBM 1301/2302 Disk Storage,* Form C28-0405.

INV A MSG

Explanation: An invalid console inquiry has been entered when only class A messages are acceptable.

NOTE: The inquiry has been ignored and processing resumed.

Action: None required by the system, but it is permissible to repeat the console inquiry if a valid class A message was intended. Otherwise, wait until "ENTER B MESSAGES" appears on the console printer before making the console inquiry.

INV CHAR IN INIT

Explanation: The channel character entered in the initialization instruction is invalid.

Action: Re-enter the instruction using a valid channel character.

I/O DATA CHECK-INCORRIGIBLE RESTART

Explanation: An uncorrectable input/output (I/O) error has occurred. The problem may be caused by erroneous System Generation control cards.

Action: Check the deck and rerun.

LOAD PROGRAM ERROR

Explanation: The Load phase of the File Organization System encountered an error during or prior to the execution of a Load function (Load, Reload, or Delete). Execution of the function is suppressed or terminated. No waiting loop is entered. A diagnostic message is printed on the SPR.

Action: No operator action is possible. The System Monitor skips to the next job. The user must refer to the SPR diagnostic message, correct the problem, and re-execute the function.

NO AUTOCODER

Explanation: Message originates from the Macro Print program.

Action: None.

NO DIRECTORY 3

Explanation: Message originates from the Macro Print program.

Action: None.

NO RECORDS LOADED

Explanation: The Load phase of the File Organization System reached the end of the input data being processed, and no records valid for loading were found. (If the organizing function in process is a reload, the original file has not been disturbed.)

Action: No operator action is possible. The user must re-examine the input data, take whatever corrective action is required, and re-execute the program.

PROGRAM NOT FOUND

Explanation: A file information card calls for an organizing function not part of the existing File Organization System.

Action: No operator action possible. To use the organizing function specified, the user must redefine the system to include that function.

RECORD ADDITION DISCONTINUED WITH . . . (key)

Explanation: All overflow areas were exhausted during the execution of the ADD phase of the File Organization System. Remaining records, beginning with the key shown, have not been added.

Action: No operator action is possible. The user must reorganize the file and re-execute the program to add additional records.

RESTORE

Explanation: The TP Supervisor has brought the Transitional Monitor back into storage after processing an interrupt. Class B messages can now be processed.

Action: Any class B message can now be processed.

RST REQ I

Explanation: Resident Monitor has received a request for an immediate restart.

Action: None required.

RST REQ – NO MDM
UEP 9 NORST

Explanation: A request for restart has been made by use of a console message. However, no MDM has been generated in the system and restart is impossible.

Action: None.

SWITCH TO NEXT SIU W/O INITIALIZATION

Explanation: Monitor has begun reading the new Standard Input Unit batch, per instructions from the console. (This message occurs when a new batch has been placed on the Standard Input Unit, and the waiting loop following the end of the previous Standard Input Unit has been broken by the $BX inquiry.)

Action: None.

UEP xyyyyy

Explanation: Unusual-End-of-Program message. Execution of the current program has been terminated, or the Transitional Monitor has determined that the remainder of the job cannot be successfully executed. If the job is being run in TEST mode, subsequent programs in the job are executed; if the job is not being run in TEST mode, the Monitor skips to the next job. "x" can be 1, 2, 3, 4, 5, or 9. The situation causing the branch to UEP, as indicated by "x", can be as follows:

If "x" is 1: The dependent program requested a phase that could not be found. "yyyyy" is blank.

If "x" is 2: The dependent program requested a phase to be loaded and executed; the phase was loaded, but no entry point was found. "yyyyy" is blank.

If "x" is 3: The dependent program attempted input/output with a symbolic unit (e.g., MR1) for which no physical unit was assigned. "yyyyy" is the address of the units position of Field 5 in the File Table that has the unusable SYMUNIT field (Field 6).

If "x" is 4: The dependent program attempted input/output with a symbolic unit which was assigned to a physical unit of a wrong device type (i.e., a device type other than that requested by the dependent program). A 4 can also mean that the SYMUNIT field (Field 6) of the File Table used by the dependent program contains an address that does not correspond to any entry in the Resident Monitor's table of symbolic units. "yyyyy" is the address position of Field 5 in the File Table that has the unusable SYMUNIT field.

If "x" is 5: The dependent program requested a phase that could not be loaded because of a permanent I/O error.

If "x" is 9: A branch to the Unusual-End-of-Program routine was made from outside the Resident Monitor. If a dependent program has branched to the UEP routine, "yyyyy" indicates the contents of the B-Address register at the time of the branch. Absence of the "yyyyy" portion of the message (i.e., "yyyyy" is blank) indicates that the Transitional Monitor entered the UEP routine and the status of core storage was not written on the Core Image file.

Action: None required by system.

ERROR (columns 1 through 48 of card)

Explanation: This message indicates:

1. The operation code in columns 16 through 20 of a Monitor control card (MON$$ in columns 6 through 10) is not valid.
2. The card is a Monitor control card that the System Monitor read when skipping cards; for example, when skipping to the next JOB card after an unusual end of program when the TEST mode is OFF.
3. The card is the first card read when the System Monitor began skipping cards. This card may be a data card or a control card for any program. If the first card when skipping begins is a Monitor control card, the card after it, unless a Monitor card, will not be typed.

Action: None.

(contents of Monitor control card columns 16 to last significant character before column 72)

Explanation: This message indicates that a Monitor control card (MON$$ in columns 6 through 10) has been read. Typing of Monitor control cards, except JOB and COMT cards, is optional; the option is selected or rejected at System Generation.

Action: None.

xyy JOB (contents of JOB card columns 21 to last significant character before column 72)

Explanation: This message indicates that a Monitor JOB card has been read. "x" is an "S" or "A" to indicate that the JOB card was read from the Standard or Alternate Input Unit. "yy" is a number that indicates the number of JOB cards that have been read from that unit since the beginning of the batch. Inclusion of an Alternate Input Unit is optional; if the option is rejected at System Generation, "x" is always an S.

Action: None.

Numbered Messages

Whenever operator action is required following a message, the program enters a waiting loop (a user option permits a HALT in the waiting loop, if desired). A five-digit identification code preceding each console printer message assists the operator in analyzing the conditions existing when the waiting loop occurs. Each of the five positions has a specific meaning.

Ten-Thousands Position (High-Order Position)

The digit in the ten-thousands position indicates the condition that exists at the time the waiting loop and/or message occurs. It also specifies the types of action possible.

DIGIT	MEANING
0	Indicates a "cannot proceed" condition (equivalent to a "dead-end halt" condition in a program outside the Operating System). The program being executed indicates to the Resident Monitor that, unless the programs are in TEST mode, subsequent programs within the same job should not be executed and the System Monitor should skip to the next job. Processing does not stop and no waiting loop is entered.
1	Indicates a message without a waiting loop.
2	Indicates an "await-action" condition; a waiting loop is provided. Messages appear on both the console printer and the SPR. Only one course of action per message can be followed by the operator to continue the program. The operator also has the option of terminating the program.
3	Indicates an "await-action" condition; a waiting loop is provided. Messages appear on both the console printer and the SPR. The operator can take action to continue the program or to terminate it.

Thousands Position

This is always a 1 (for sc program, Disk Loader, and Disk Library Loader numbered messages) or 0 (for numbered messages issued by any other program).

Hundreds Position

This is used to designate the Operating System component issuing the message, as follows:

NUMBER	PROGRAM
1-2	IOCS
3	Tape Sort or Disk Sort
4	Utilities
5	System Monitor, Tele-processing Supervisor, or the File Organization System
6	Simulators and Peripheral Operations
7-8-9	Language Processors

Tens and Units Positions

The numbers for these positions are supplied by the Operating System component issuing the message. These numbers serve to distinguish one message from others issued by the same component. The Generalized Tape and Disk Sort programs use the tens position to indicate the phase number.

Messages

Numbered messages that may appear on the console printer are listed below. The digits, extended to the left in this listing for easy reference, are part of the message.

00222

Explanation: A tape read error, other than wrong-length record, occurred while the Bootstrap 2 routine was being read. The computer has halted.
Action: Begin bootstrap again.

00301

Explanation: The control card diagnostic routine of the tape sort or merge program or the disk sort program has detected an uncorrectable error in the control data supplied by the user. The program gives control to the Resident Monitor's End-of-Program routine, and the Monitor skips to the next JOB card unless the system is in TEST mode.
Action: None. The user must correct the control card in error and re-execute the program.

00301 SDP

Explanation: Either the DSORT or DUNIT card is missing and the tape or disk Sort Definition Program cannot complete its execution. The System Monitor is notified that any subsequent dependent programs should not be executed, and the Monitor should skip to the next job if possible. A message is also written on the Standard Print Unit.
Action: No operator action is possible. The user must provide the missing control card and re-execute the program.

00302

Explanation: The tape sort or merge program or disk sort program has found the card type field of a control card to be invalid. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must correct the control card in error and re-execute the program.

00303

Explanation: The tape sort or merge program or disk sort program has found an invalid parameter name on a control card. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must correct the control card in error and re-execute the program.

00304

Explanation: The tape sort or merge program or disk sort program has found an error in one of the parameter fields on a control card. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must correct the control card in error and re-execute the program.

00305

Explanation: The tape sort or merge program or disk sort program has found that one of the parameter fields on a control card is longer than permitted. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must correct the control card in error and re-execute the program.

00306

Explanation: The amount of core storage available for the tape sort or merge program is less than the amount required for execution. The program gives control to the Resident Monitor's End-of-Program Routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must reduce the size of the storage requirements for the sort or merge program and re-execute the program.

00311

Explanation: The amount of core storage available for Phase 1 of the tape sort or disk sort program is less than the amount required for execution. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must reduce the size of routines sharing core storage with Phase 1, or reduce the Phase 1 core-storage requirements by reducing the input block length. He must then re-execute the program.

00312

Explanation: All Phase 1 output tapes for the tape sort program have reached end of reel before all of the input file has been processed. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must reduce the input file size or increase the merge order and re-execute the program.

00313

Explanation: The tape sort program has found that the number of physical units assigned to the first merge file is less than the merge order specified. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must re-execute the program with as many physical units assigned to each merge file as the order specified or with the merge order redueed.

00314

Explanation: The number of data records processed by Phase 1 up to this point exceeds the capacity of the sort.
Action: The sort must be restarted from the beginning. Either the number of input records must be reduced or the amount of disk storage available to the sort must be increased.

00315 NO INPUT DATA

Explanation: The input tape to the disk sort program does not contain any data records. The program gives control to the Resident Monitor's End-of-Program routine.
Action: No operator action possible. The user must re-execute the program and give the disk sort program an input tape with data records.

NOTE: If the output from this sort is used as input to a subsequent program, unusual conditions may occur since the output unit has not been initialized.

00321

Explanation: The amount of core storage actually available for Phase 2 of the tape sort or the disk sort program is less than the amount required for execution. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must reduce the size of the routines sharing core storage with Phase 2 and re-execute the program.

00322

Explanation: Phase 2 of the tape sort program has completed two successive passes without being able to reduce the number of sequences produced. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must reduce the file size or increase sort capacity and re-execute the program.

00323

Explanation: The tape sort program has found that the number of physical units assigned to one of the merge files is less than the merge order specified. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must re-execute the program with as many physical units assigned to each merge file as the merge order specified, or with the merge order reduced.

00324

Explanation: During a pass of Phase 2 of the tape sort program, all merge output tapes have been filled with records or reached end of reel before the complete file was written. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must re-execute the program with as many physical units assigned to each merge file as the merge order specified, or with the merge order reduced.

00331

Explanation: The amount of core storage available for Phase 3 of the tape sort or merge program or the disk sort program is less than the amount required for execution. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must reduce the size of the routines sharing core storage with Phase 3, or reduce the Phase 3 core-storage requirements by reducing the output block length, and re-execute the program.

00332

Explanation: A record has been found to be out of sequence in the output of Phase 3 of the tape sort or merge program or of the disk sort program. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. An out-of-sequence condition usually indicates operational failure or invalid input.

00333

Explanation: The tape sort or merge program has found that the number of physical units assigned to one of the merge files, for a sort only, is less than the merge order specified. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must re-execute the program with as many physical units assigned to each merge file as the merge order specified, or with the merge order reduced.

00334

Explanation: During Phase 3, the disk space assigned for the output has been filled and has reached end of file before all the input file has been processed. The program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The user must either reduce the file size or increase the disk area assigned for the output file.

00334 NO DATA ON XXX

Explanation: In opening the tape units for one of the input files, the merge program has determined that the unit specified in the message has no data records. XXX is the x-control field for the merge unit with no data records. This message can appear only for a merge program.
Action: No operator action is possible. The user must reassign the units, omitting the one with no data records, reduce the merge order, and re-execute the program.

00438

Explanation: The instruction loaded by the Bootstrap routine into location 00000 is not valid because it does not contain a valid non-overlap character for any channel in location 00002. The computer has halted.
Action: Begin Bootstrap again.

00501 SOF DIRECTORY NOT FOUND

Explanation: Transitional Monitor is unable to find a directory for the System Operating File.
Action: None. (System Operating File must be regenerated.)

00502 MJB DIRECTORY NOT FOUND

Explanation: Transitional Monitor is unable to find a directory for the disk Job file. The directory has been inadvertently destroyed, an error was made in assignment, or the Linkage Loader is not functioning properly.
Action: Reinitialization is necessary, if the batch is to be continued. The situation should first be analyzed to determine the exact cause of error. Regeneration of the System Operating File may be required.

00503 INVALID DIRECTORY RECORD

Explanation: Transitional Monitor has located what should be the directory for the disk System Operating File, but the record read was not a valid directory record.
Action: None. (System Operating File must be regenerated.)

00504 SIU/AIU SWITCH FAILED

Explanation: The switch to either the SIU or the AIU has failed.

Action: Check assignment and device type for SIU and AIU. Rerun.

00510 REINIT

Explanation: A branch to /EOP/ or /UEP/ has been taken, the Monitor has attempted to complete pending I/O operations for the program and the attempt has failed. Reinitialization is required.

00551 LEVEL n WL

Explanation: The File Organization System has encountered a wrong length (too short) File Directory and Index area entry. The character "n" in the message indicates the level at which the error exists: F for File Directory, 0 for Level 0, 1 for Level 1, etc. A closed processing loop has been entered.

Action: Operator action must be taken to terminate execution. Perform these steps:

1. Press INQUIRY REQUEST.
2. Type $10.
3. Press INQUIRY RELEASE.

Execution can also be terminated through these steps:

1. Press COMPUTER RESET.
2. Press START.

00590 MAX FILE SIZE EXCEEDED

a. *Explanation:* The number of disk tracks assigned to the TP Library file, MW3, has been exceeded.
   Action: More tracks must be assigned to MW3.

b. *Explanation:* The number of records in the TP Library file exceeds 9999.

Action: The TP Library file must be subdivided into two or more files

00591 LIBGEN ERROR

Explanation: A serious input error has caused one or more TP programs to be deleted from the TP Relocatable Library during generation. The nature of the error is indicated on the SPR. The generation of the library continues normally. When it is completed, a branch is made to the Monitor EOP routine.

Action: Input errors must be corrected and the library generation repeated.

01551 END JOB

Explanation: This message, produced by the System Generator Disk Loader program, indicates that the program has completed processing.

Action: None.

10101 mms (input/output operation) (tape record length, 1301 disk address, or 1311 disk control word)

Explanation: IOCS error message. An uncorrectable error has occurred on the device indicated by the "input/output operation." The "mm" indicates the type of error; "s" is a character formed by the bits associated with the Channel Status Indicators that were on at the completion of the input/output operation. Figure 93 indicates the explanation and action for all IOCS error messages except those for the 1311 disk drive. In this figure, "disk" refers to 1301 or 1302 Disk Storage. Figure 94 contains the explanation and action for IOCS error messages issued in connection with a 1311 operation.

Messages for tape read errors include the length of the record (except for Not Ready conditions). Messages for 1301 disk errors include the disk address used (in the form "amttttthh"--access mechanism, module, track, HA2). Messages for 1311 errors include the disk control word (in the form "°aaaaaasss"-- disk drive number, sector address, and sector count).

Action: In most cases, the program currently running has made provision for error conditions, and the console sheet serves merely as a log of input/output trouble. In some instances, however, operator action is required. Figures 93 and 94 indicate the specific action, if any, that should be taken for each message. If the same message is rapidly repeated, perform the following:

1. Press INQUIRY REQUEST.
2. Type $10.
3. Press INQUIRY RELEASE.

NOTE 1: If, during a tape operation, 10101 DC4 repeats for the same record and the length is given as 13 or less, the tape may be of the wrong density. The job must be rerun.

NOTE 2: If the 10101 message appears for a SPOOL Unit-Record Device, the operator should first take the necessary corrective action, then press PRIORITY ON twice to resume the SPOOL operation.

NOTE 3: If the format of the I/O instruction for carriage control is, for example, NR1 NF1N!, the N and N! are NOPs used to pad the instruction to 5 characters for IOCS. F is the carriage control operation code. 1 is the carriage control d modifier.

10102 cu xxxxx

Explanation: The block count on the trailer label of an input tape does not equal the block count accumulated by IOCS. "cu" is the channel and unit of the tape; "xxxxx" is the difference between the IOCS count and the label count.

Action: None. (IOCS ignores the condition.)

10103 CPT nnnx

Explanation: Records have been written on the Core Image file; unusual end of program occurred or the current program took a checkpoint. "nnn"' is the number of such records since the last Initialization of the system; "x" is either C if the records were written on the Core Image file for checkpoint purposes, or D if written on the Core Image file as a result of unusual end of program.

Action: None.

10104 REP INQ

Explanation: Either a console inquiry was made while a previous inquiry was being processed, or the operator pressed the INQUIRY CANCEL key. The inquiry being entered is ignored and processing continues.

Action: Repeat the console inquiry that was being entered.

10105 END RST

Explanation: The Restart routine has completed its processing. Control will now be given to the program being restarted.

Action: None.

10109 cu aaa.bbb.cc

Explanation: This message gives the statistics on *input* errors found by the IOCS. It is typed at each end of reel and each IOCTL CLOSE and IOCTL FEOR macro-instruction.

"cu" is the channel and unit number
"aaa" is the number of entries to the IOCS error routine
"bbb" is the number of permanent read errors
"cc" is the number of noise records

Action: None.

10109 cu aaa.bbb

Explanation: This message gives the statistics on *output* errors found by the IOCS. It is typed at each end of reel and each IOCTL CLOSE and IOCTL FEOR macro-instruction.

"cu" is the channel and unit number
"aaa" is the number of entries to the IOCS error routine

	Error Type	Channel Status Character	Affected Input/Output Device Type	Explanation	Action
Not Ready	NR	1	Tape, disk, card reader, card punch, printer	The relevant device (e.g., module of 1301 Disk Storage) is not ready.	Ready the device.
	NR	3	Tape	The unit was made not ready while in a busy status.	Ready the device.
	NR	7	Disk	The IBM 7631 File control is not ready.	Ready the 7631.
	NR	J	Disk	The addressed access mechanism is inoperative.	Ready the access.
Data Check	DC	4	Tape, disk, card reader, card punch, printer	Tape Input Operation: (a) If record length is greater than 12 characters a backspace followed by a read operation has been executed 99 times. (b) If record length is 12 characters or less, ten consecutive noise records have been read without changing the B-address of the affected input instruction. This indicates that the relevant tape unit has been set to the wrong density. Tape Output Operation: A backspace, a skip and blank tape, and a write operation have each been executed, in sequence, 25 times. Disk: The relevant input/output operation has been re-executed 4 times. Card Reader: The last card read is in error. Card Punch: Machine parity error. The card is not punched. Printer: Machine parity error. The line is not printed.	(a) None. (b) Set the relevant tape unit to the correct density. None. None. Run out card deck and reload. Make the card reader Ready. Make the device Not Ready, then Ready. Make the device Not Ready, then Ready.
	DC	5	Disk	The relevant input/output operation has been re-executed once.	None.
	DC	M	Tape, disk, card reader	See "DC4" above.	See "DC4."
	DC	@	Tape	See "DC4" above.	See "DC4."
Condition	UC	8	Card punch, printer	Card Punch: An incorrect card has been punched. The erroneous card has been selected into stacker 0. Printer: A timing error or hammer fire check has occurred. The line is not printed	Mark the erroneous card, place it in the deck, make device Not Ready, then Ready. Make the device Not Ready, then Ready.
Wrong Length Record	WL	-	Tape, disk, card reader, card punch, printer	Tape Input Operation: The input operation has been re-executed 9 times. Tape Output Operation: The output operation has been re-executed 25 times. Disk: The input/output operation has been re-executed four times. Card Reader (IBM 1402): The input operation has not been re-executed. Card Reader (IBM 1442): The last card read is in error. Card Punch: The output operation has not been re-executed. Printer: The output operation has not been re-executed.	None. If the error persists on the same record, the program should be terminated. None. None. Run out card deck and reload. Make the card reader Ready. None. None.
	WL	Q	Tape	Tape Input Operation: The wrong-length record and input/output condition indicators have been turned on. The tape operation has been re-executed 9 times.	None.
No Record Found	NF	Z	Disk	The input/output operation has been re-executed 4 times, the access mechanism has been recalibrated, and the operation has been re-executed an additional four times.	If the message is repeated for the same record, the program should be terminated.
No Track Found	IT	V	Disk	The relevant access mechanism has been recalibrated and the input/output operation has been re-executed one time.	If the message is repeated for the same record, the program should be terminated.
Mode Check	MD	V	Disk	Data check, no transfer, and condition indicators have resulted from a disk operation.	None.
Circuit Check	CC	8	Disk	A 7631 circuit check has occurred. This input/output operation has been re-executed one time.	None.
	CC	Q	Disk	See "CC8," above.	See "CC8."
1301 Circuit Check Invalid Operation Write Disk Check Without Mode	OP	9	Disk	The input/output operation has been re-executed one time.	If the message is repeated for the same record, the program should be terminated.
UNCTL FILE, SSF,d	NT	&	Card Reader	Two UNCTL FILE, SSF,d macro-instructions have been executed without an intervening Read A Card instruction that contains 9 in the units position of its x-control field. Two Read A Card instructions with 9 in the units position of their x-control fields have been executed without an intervening UNCTL FILE,SSF,d Macro-instruction.	None.
Write Inhibit	NT	&	Disk	Write operation was attempted, but write inhibit switch on 7631 is ON.	Turn Switch OFF, or terminate program.
Invalid Write Address	NT	&	Tape	A write instruction was erroneously addressed to a group mark word mark.	None
Unknown Error	UE	P	Disk	The IOCS cannot determine the exact nature of the error. It is looping on the operation that caused it.	Terminate program.

Figure 93. Error Type — Channel Status Character

	Error Type	Channel Status Character	Affected Input/Output Device Type	Explanation	Action
Not Ready	NR	J	1311	The indicated drive (0,1,2,3, or 4), as represented in the disk address field by its alternate code (0,2,4,6, or 8, respectively), is not ready (usually on a seek operation).	Ready the drive.
	NR	1	1311	The Write Address key light is in the wrong setting for the write operation being performed. It must be "on" for write operations with a DTF order entry of 6 or @, and off for all other write operations.	Change the Write Address key setting.
Data Check	DC	4	1311	The input/output operation has been re-executed 4 times, the access mechanism recalibrated through a return to home seek, and the operation re-executed an additional 4 times.	If the message is repeated for the same record, the program should be terminated.
	DC	5	1311	See "DC4" above.	See "DC4".
	DC	M	1311	See "DC4" above.	See "DC4".
Wrong-Length Record	WL	-	1311	The input/output operation has been re-executed 4 times, the access mechanism recalibrated by a return to home seek, and the operation re-executed an additional 4 times.	None.
No Record Found	NF	Z	1311	The input/output operation has been re-executed 4 times, the access mechanism recalibrated through a return to home seek, and the operation re-executed an additional 4 times.	If the message is repeated for the same record, the program should be terminated.
End of Cylinder Condition	CC	8	1311	One or more sectors of data have been transferred within this operation, but the present attempt to transfer data has resulted in either a "no record found" or "absence of sector address" condition. (Example: cylinder overflow condition.)	If the message is repeated for the same record, the program should be terminated.
	CC	Q	1311		
Unknown Error	UE	P	1311	The IOCS cannot determine the exact nature of the error. The error is causing a loop.	Terminate the program

Figure 94. Error Type and Channel Status Character Meanings — IBM 1311 Disk Drives

"hbb" is the number of times backspace and skip is performed

Action: None.

NOTE: When a file is opened as an output file and closed as an input file, or opened as an input file and closed as an output file, the ERROR STATISTICS message is printed according to the way the file was *closed.*

10128 SPU-SPR SAME UNIT

Explanation: Checkpoint specifies that the Standard Print Unit and Standard Punch Unit are assigned to the same tape unit; therefore, the tape will not be repositioned.

Action: None.

10133 SIU U/R

Explanation: Checkpoint specifies that the Standard Input Unit is a card reader; therefore, no repositioning will be done.

Action: None.

10134 AIU U/R

Explanation: Checkpoint specifies that the Alternate Input Unit is a card reader; therefore, no repositioning will be done.

Action: None.

10190 xx

Explanation: The operator has tried to initialize SPOOL on a unit that is already being used in SPOOL processing. "xx" is the physical unit that is already assigned.

Action:

1. Press INQUIRY REQUEST.
2. Either: (a) re-enter the $B7-type message specifying a physical unit other than "xx"; or (b) enter a $B7Rxxyy release message ("xx" and "yy" are the assigned physical units to be released).
3. Press INQUIRY RELEASE.

10191 nnnnnnnnnn

Explanation: The "nnnnnnnnnn" SPOOL editing routine is not on the System Operating File.

Action:

1. Press INQUIRY REQUEST.
2. Either: (a) re-enter the $B7-type message specifying the correct program name; or (b) enter a $B7Rxxyy release message ("xx" and "yy" are the assigned physical units to be released).
3. Press INQUIRY RELEASE.

10192 SIP

Explanation: An attempt has been made to initialize a SPOOL control routine that is already being executed.

Action: If the operator wishes to terminate the function in process, he must:

1. Press PRIORITY ON.
2. Press INQUIRY REQUEST.
3. Enter a $B7Rxxyy release message ("xx" and "yy" are the assigned physical units to be released).
4. Press INQUIRY RELEASE.

5. Press INQUIRY REQUEST.
6. Enter the correct $B7-type message.
7. Press INQUIRY RELEASE.

10199 EOSn
Explanation: SPOOL end-of-job message. "n" is the channel on which the SPOOL operation was performed.
Action: Press PRIORITY ON twice to process another file.

10310 xxxxx.yyyyyyy
Explanation: General diagnostic message issued at the completion of Phase 1 of a tape sort program. "xxxxx" is the number of sequences produced and "yyyyyyy" is the total number of records processed during Phase 1. This console message is issued only if the user has specified the CNSLMSG-Y parameter in the SORTTYPE control card; otherwise, no message is written on the console.
Action: None required.

10321 qqq.xxxxx
Explanation: General diagnostic message issued at the completion of each pass (qqq) of Phase 2 of a tape sort program. "xxxxx" is the number of sequences produced by the pass. This console message is issued only if the user has specified the CNSLMSG-Y parameter in the SORTTYPE control card; otherwise, no message is issued.
Action: None required.

10330 xxxxxxx.yyyy.zzzz
Explanation: The tape sort or merge program has been completed. The record and padding counts have been recapitulated as follows:
"xxxxxxx" records have been written on the output file
"yyyy" high padding records are included in the output
"zzzz" low padding records are included in the output
This console message is issued only if the user has specified the CNSLMSG-Y parameter in the SORTTYPE control card; otherwise, no message is written on the console.
Action: None required.

10331 OUTPUT cu
Explanation: The output file has been written on tape. The location of the first output reel is identified as "cu", where "c" is the channel and "u" is the unit.
Action: None required.

10332 LAST OUTPUT UNIT cu
Explanation: The output file has been written on tape. The location of the last output reel is identified as "cu", where "c" is the channel and "u" is the unit.
Action: None required.

10333 LAST TRACK amtttthh, NUMBER OF WRITES xxxxx
Explanation: The output file of a disk sort program has been written on disk storage. "amtttthh" is the disk address word for the last track of the output file: "a" is the access mechanism; "m" is the module; "tttt" is the track address; and "hh" is the home address identifier (HA2). "xxxxx" is the number of writes.
Action: None required.

10401 END OF JOB
Explanation: The NO GO switch has been set.
Action: No operator action is possible.

10520 CGO-LL
Explanation: A language processor has canceled the Go file and execution of the Linkage Loader is, therefore, being bypassed.
Action: None.

10521 CGO-MJB
Explanation: The contents of the Job file are not valid; therefore, the EXEQ card for a program on the Job file is being bypassed.
Action: None.

10522 xxx OP INV
Explanation: The first, second, or third operand of the EXEQ card just read is invalid; the card is therefore being bypassed. "xxx" is the specific operand, and can be 1ST, 2ND, or 3RD.
Action: None.

10523 NO AIU
Explanation: An EXEQ card with a third operand has just been read but cannot be processed because facilities for using an Alternate Input Unit were not specified at System Generation.
Action: None.

10524 AIU ACTIVE
Explanation: An EXEQ card with a third operand has just been read from the Alternate Input Unit and is, therefore, being bypassed.
Action: None.

10525 CHG xxxxx
Explanation: The symbolic unit (e.g., MR3) in the third operand of the EXEQ card just read cannot be found in the Resident Monitor's assignment table. Therefore, the Transitional Monitor cannot change to that unit. The EXEQ card is bypassed. "xxxxx" is the address of the Transitional Monitor routine that tried to effect the change.
Action: None.

10526 CHG UNASGN
Explanation: The symbolic unit in the third operand of the EXEQ card just read is not currently assigned to a physical unit. The EXEQ card is bypassed. (This Message also could occur if parts of the Resident Monitor were destroyed, breaking the assignments for the Standard and/or Alternate Input Unit.)
Action: None.

10527 CHG INV
Explanation: The symbolic unit in the third operand of the EXEQ card just read is currently assigned to a disk physical unit, which is not permissible. The EXEQ card is bypassed.
Action: None.

10529 GO DSK EXC
Explanation: During compilation, the disk physical unit assigned to the Go file has been exceeded. The language processor has canceled the Go file and returned control to the System Monitor.
Action: None.

10530 NOT FOUND
Explanation — Tape System Operating File: The program named in the EXEQ card cannot be found on the System Operating File (if SOF is specified on the card), or on the Job file (if MJB is specified on the card). The EXEQ card is bypassed.
Explanation — Disk System Operating File: The program named in the EXEQ card cannot be found in the directory specified by the card. The EXEQ card is bypassed.
Action: None. The System Operating File or Job file should be analyzed to determine the reason for the failure in a tape system. The directory for the System Operating File or Job file should be analyzed to determine the reason for the failure in a disk system.

10531 NOT FOUND IN SOF DIRECTORY
Explanation: The program named in the EXEQ card

is not listed in the tape System Operating File directory. The EXEQ card is bypassed.
Action: None. The tape System Operating File directory should be analyzed to determine the reason for the failure.

10532 INCOMPATIBILITY IN BLOCK COUNTS
Explanation: Using block counts to search the System Operating File, the Transitional Monitor is unable to locate the desired program. One correction attempt will be made and, if not successful, the System Operating File will be rewound and sequentially searched.
Action: None.
NOTE: The frequent appearance of this message indicates that one or more of the following conditions exists:
1. Block counts in directory are wrong.
2. Block counts in phase headers are wrong.
3. Backspace often fails on the tape unit.
Correction of the trouble will improve search time for the System Operating File.

10535 MJB INVALID LOC
Explanation: In searching the Job file, the System Monitor has read one record from the file; this record is not a phase header record. The two possible causes are:
1. The physical unit assigned to the Job file does not contain a valid Job file.
2. The Job file tape has been moved to an incorrect position.
Action: None. Control is given to the Monitor's Unusual-End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed; if the system is not in TEST mode, the Monitor skips to the next job.

10570 TP OPEN
Explanation: This message indicates that the TP complex is open.
Action: None.

10571 CTL ERR
Explanation: The TP Supervisor received an improper control message from the Standard Input Unit or the console. The TP Supervisor ignores the control message and continues processing.
Action: None.

10572 TP CLOSE
Explanation: This message indicates that the TP complex is closed.
Action: None.

10573 FALSE ATT CH n
Explanation: The TP Supervisor has not serviced five interrupts from the 1414 Input/Output Synchronizer on the channel indicated by "n", because it has been unable to determine the device that caused the interrupts.
Action: None.

10578 BATCH DUMP—DO NOT ENTER B MSG
Explanation: The TP Supervisor has put the dependent program on tape to process an interrupt. Therefore class B messages cannot be processed.
Action: Do not enter any class B messages, until a "10579 BATCH RESTORE—ENTER B MSGS" message.

10579 BATCH RESTORE—ENTER B MSGS
Explanation: The TP Supervisor has brought the Transitional Monitor back into storage after processing an interrupt. Class B messages can now be processed.
Action: Any class B messages can now be entered.

10581 TP xxxxx MSG LOST
Explanation: The TP Supervisor writes this message when the installation chooses not to process an interrupt. "xxxxx" is the name of the TP program needed to process the interrupt. (See the 20580 message.)
Action: None.

10582 TP ONLY
Explanation: This message is written after a Monitor TP ONLY control card is read and the TP Supervisor has been conditioned for only TP processing.
Action: None.

10583 THE TP-LIBRARY FILE PRECEDED BY A DIRECTORY IS NOW ON DISK MODULE/S AT TRACK NUMBERS ASSIGNED TO /MLT/.
Explanation: The disk TP Library file has been generated and is now ready for use.
Action: None.

10584 NO TRACKS AVAILABLE FOR KWDIRCTRY
Explanation: The number of tracks assigned for the disk Directory Work file is too small.
Action: Re-execute the program with a larger number of tracks assigned for the Directory Work file.

10585 NO TRACKS AVAILABLE FOR JOBFILE
Explanation: The number of tracks assigned for the disk Job file is too small.
Action: Re-execute the program with a larger number of tracks assigned for the Job file.

10586 NO TRACKS AVAILABLE FOR TPLIBFILE
Explanation: The number of tracks assigned for the disk TP Library file is too small.
Action: Re-execute the program with a larger number of tracks assigned for the TP Library file.

10587 IO DATA CK—UNCORRECTABLE—RESTART
Explanation: An uncorrectable input/output error has occurred.
Action: Re-execute the program.

10588 xxxx MORE CORE REQUIRED
Explanation: The size of the Resident Monitor does not permit the use of this program. The size of the Resident Monitor must be reduced by the number of characters indicated by "xxxx" in order to execute the program.
Action: None.

10589 RELOCATABLE LIBRARY ON DISK FILE MW3, TRACKS xxxx-yyyy BACKUP TAPE ON zzz
or
10589 RELOCATABLE LIBRARY ON TAPE zzz
Explanation: A TP Relocatable Library has been created on the indicated file and control has been returned to the Resident Monitor's End-of-Program routine. "xxxx" and "yyyy' are track addresses; "xxxx-yyyy" indicates the set of consecutive tracks comprising symbolic unit MW3. "zzz" is the symbolic unit (e.g., MR4). The backup tape message is produced only if the backup tape has been created.
Action: None.

10701 AUTOCODER NOT COMPLETED
followed by:
I/O ERROR NOT CORRECTABLE
or
UNEXPECTED END OF FILE ON MWx
or
LIBRARY DIRECTORY NOT FOUND
or
ERROR IN MACRO LIBRARY READ
or
MACRO LIBRARY NOT FOUND
or
RECURSION CAPACITY EXCEEDED
or
MAXIMUM NUMBER OF DTFS EXCEEDED

Explanation: The Autocoder language processor cannot complete execution, due to the condition stated in the message. "x" can be 1, 2, or 3. The assignment for the Go file, if made, is canceled.
Action: None.

10702 NOGO SWITCH SET
Explanation: This message is produced by the Autocoder language processor when a source statement is flagged (except for the "R" flag) as erroneous. The Go file, if assigned, is canceled.
Action: None.

10980 SHORT LENGTH WORK FILE
(Input/output instruction)
Explanation: The COBOL language processor cannot complete execution, because of an end of file on a physical unit assigned, as a Work file. The "input/output instruction" identifies the physical unit. The Go file, if assigned, is canceled.
Action: None for this run, but the Work file *tape* should be checked for an incorrectly placed reflective marker, or a different *disk* area must be assigned for future compilations.

10990 OUTPUT INCOMPLETE SOURCE ERROR
Explanation: The COBOL language processor has terminated output of the object program, because of an error in the source program. The Go file, if assigned, is canceled. Compilation, for diagnostic purposes, continues.
Action: None.

10999 OUTPUT INCOMPLETE I/O ERROR
(Phase name)
Explanation: The COBOL language processor cannot complete execution, because of an input/output error. The Go file, if assigned, is canceled.
Action: None.

The following messages (with the first three digits 115) are given during System Generation functions. Messages 11501 through 11523 and 11562 through 11574 apply to the SG1 and SG2 programs. Messages 11501 through 11520 apply specifically to a tape-oriented system; messages 11562 through 11574 apply specifically to a disk-oriented system. All messages numbered 11540, and message 11541, apply to the SG3 program. Messages 11544 through 11549 apply to the SG4 program. Message 11588, all messages numbered 11559, and message 11560 apply to the SG5 program. Disk Loader messages in this "115" grouping are 11551 through 11556; 11557 is a Disk Library Loader message.

11501 xxxxxxxxxx NOT ON TAPE
Explanation: SG1-SG2 (tape-oriented system) message. A request has been made for the "xxxxxxxxxx" program, but it cannot be located on the SOF or on the Relocatable or Create Libraries. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck to see that the proper calling method, spelling, etc., was used, and rerun the job.

11502 SEQERR-xxxxx
Explanation: SG1-SG2 (tape-oriented system) message. A macro statement sequence number with a low-order blank or an out-of-order sequence number has been encountered on the SIU. "xxxxx" is the name of the macro statement. Execution continues, but the statement in question is omitted from the library and is printed on the SPR.
Action: The user should check the control deck.

11503 DIRECTORY x NOT AVAILABLE
Explanation: SG1-SG2 (tape-oriented system) message. "x" can be a 1 or a 3. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck to make sure the directory has been generated prior to this reference. If "x" is not 1 or 3, the PHASE card for the directory has been mispunched. The job must be rerun.

11504 xxxxxxxxxx LIBRARY
Explanation: SG1-SG2 (tape-oriented system) message. A request has been made for the library named "xxxxxxxxxx", but that library cannot be located or it does not exist. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck to make sure that a library named "xxxxxxxxxx" has been copied, updated, or added by SG1. After the correction is made, the job must be rerun.

11505 NEW SOF ON xxx
Explanation: SG1-SG2 (tape-oriented system) message. "xxx" is the x-control field for the unit on which the System Generation *output* file is located. Execution continues.
Action: None required.

11507 LIB TYP UNKNOWN
Explanation: SG1-SG2 (tape-oriented system) message. A request has been made for a library whose type code is not M, R, or C (for Macro, Relocatable, or Create, respectively). Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck. The PHASE card for the library header may have been punched incorrectly. M, R, or C must be in column 62 of the PHASE card. After the correction is made, the job must be rerun.

11508 BACKSPACE FAILURE – SOF
Explanation: SG1-SG2 (tape-oriented system) message. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: Restart.

11509 BACKSPACE FAILURE – MJB
Explanation: SG1-SG2 (tape-oriented system) message. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: Restart.

11510 NEW LIBRARY ON xxx
Explanation: SG1-SG2 (tape-oriented system) message. "xxx" is the x-control field for the unit on which the new library is located. Execution continues.
Action: None required.

11511 UNKNOWN HDR TYP
Explanation: SG1-SG2 (tape-oriented system) message. The header record is not in the proper format. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck. Check that all the libraries processed by SG1 were done in one

hlock and were processed before absolute programs. Check also that no conflict exists in input/output assignments. After the correction is made, the job must be rerun.

11512 NO TYPC COUNTS
Explanation: SG1-SG2 (tape-oriented system) message. The specific of this condition has not been determined. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck for extraneous PHASE cards, order of cards, etc. After the correction is made, the job must be rerun.

11513 EXTRANEOUS HEADER
Explanation: SG1-SG2 (tape-oriented system) message. The record descriptions contained on MW1 (header records) do not agree with the contents of the Job file. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check that *all* requests for SG1 to insert, delete, replace, and add library material were made prior to requests to process absolute-format records. He should also check to he sure that no conflict exists in input/output assignments. After the correction is made, rerun the job.

11514 CHECK CONTROL DECK
Explanation: SG1-SG2 (tape-oriented system) message. A System Generation control card is placed where none is expected, or a control card is not where it should be (e.g., a LOCATM card followed by a DELETR card). Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must correct the control deck and rerun the job.

11515 MODULE xxxxxxxxxx NOT ON GO TAPE
Explanation: SG1-SG2 (tape-oriented system) message. This message occurs during a library maintenance operation. The subprogram named "xxxxxxxxxx" was not immediately available on the SIU and was not found on the Go file. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck. The subprogram name may have been mispunched. After the correction is made, rerun the job.

11516 SOF RECORD TOO LARGE TO COPY
Explanation: SG1-SG2 (tape-oriented system) message. SG1, when working with the largest possible records, cannot copy an SOF on a smaller machine than that used to generate the SOF. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must regenerate the SOF.

11517 NO ALTERNATE LIBRARY HEADER
Explanation: SG1-SG2 (tape-oriented system) message. SG1 has been directed to find an external library, but did not find the identifying header record on LIB. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The tape is probably the wrong reel. Mount the correct reel and begin again.

11518
Explanation: SG1-SG2 (tape-oriented system) message. A macro routine or a model statement has been specified, but does not appear on the system file. The questionable reference is printed on the SPR. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user should check the control deck. The input to SG1 may be out of sequence. After the correction is made, rerun the job.

11519 MACRO DIR EXCEEDS 240
Explanation: SG1-SG2 (tape-oriented system) message. The maximum number of entries for the Macro Library (240) has been exceeded. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must reduce the number of macro routines to 240 or less and rerun the job.

11520 NO SYSGEN END CARD
Explanation: SG1-SG2 (tape-oriented system) message. The SG program did not encounter an END card. Execution continues. The SG program processes the last card read as if it were followed by an END card.
Action: None required if all other cards are in order. If the cards are not in the correct order, an error message will result; the user should then check the control deck, place the cards in the proper order, insert the END card, and rerun the job.

11521 HDR CD INVALID
Explanation: SG1-SG2 message. Column 60 of the EXEQ card indicates that a header is desired on the output tape; the card immediately following the EXEQ card on the SIU is not a valid header card. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must correct the control deck and rerun the job.

11522 CC60 OF EXEQ CARD INVALID
Explanation: SG1-SG2 message. Column 60 of the EXEQ card has a digit other than 1 or 2. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must correct the EXEQ card to reflect the type of header desired, and rerun the job.

11523 SOF EXCEEDS 154 LIMIT
Explanation: SG1-SG2 (tape-oriented system) message. A tape SOF may have no more than 154 items, and this number has been exceeded. Execution halts. A special end-of-program is set, and control returns to the System Monitor.
Action: The user should check the control deck; some items may have been copied several times. Correct the deck and rerun the job.

11540 DIAGNOSTIC END 01
Explanation: SG3 message. The tape symbolic unit assigned for the History file is not valid. Valid symbolic units for this purpose are any Work (MWn) or Reserve (MRn) files that were included in the Resident Monitor at System Generation. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed; if the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must correct the control deck and rerun the job.

11540 DIAGNOSTIC END 02
Explanation: SG3 message. Neither the Ignore Option nor the Reset Option has been chosen for the file lock character, and the file lock character supplied by the user has violated the lock feature. This message is followed by the 11541 ENTER $3P OR $3S message.
Action: Enter the appropriate response to the 11541 message on the console (see the 11541 message description).

11540 DIAGNOSTIC END 03
Explanation: SG3 message. The file requested on the last SG3 control card is not on the History tape. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must correct the card in error and rerun the job.

11540 DIAGNOSTIC END 04
Explanation: SG3 message. The last SG3 control card read has no $ in column 1. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next job card.
Action: The user must correct the card in error and rerun the job.

11540 DIAGNOSTIC END 05
Explanation: SG3 message. The last SG3 control card has no entry in the operation field (i.e., it is not a COPY or UPDAT card). This message is followed by the 11541 ENTER $3P OR $3S message.
Action: Enter the appropriate response to the 11541 message on the console (see the 11541 message description).

11540 DIAGNOSTIC END 06
Explanation: SG3 message. Column 13 of the last UPDAT control card read contains a character other than a P or a blank. This message is followed by the 11541 ENTER $3P OR $3S message.
Action: Enter the appropriate response to the 11541 message on the console (see the 11541 message description).

11540 DIAGNOSTIC END 07
Explanation: SG3 message. Column 12 of the last SG3 control card contains a character other than an H or a blank. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must correct the card in error and rerun the job.

11540 DIAGNOSTIC END 08
Explanation: SG3 message. Column 11 of the last UPDAT card control card read contains a character other than a P or a blank. This message is followed by the 11541 ENTER $3P OR $3S message.
Action: Enter the appropriate response to the 11541 message on the console (see the 11541 message description).

11540 DIAGNOSTIC END 09
Explanation: SG3 message. Column 10 of the last UPDAT control card read contains a character other than an L or a blank. This message is followed by the 11541 ENTER $3P OR $3S message.
Action: Enter the appropriate response to the 11541 message on the console (see the 11541 message description).

11540 DIAGNOSTIC END 11
Explanation: SG3 message. The last SG3 control card read contains no program identification. This message is followed by the 11541 ENTER $3P OR $3S message.
Action: Enter the appropriate response to the 11541 message on the console (see the 11541 message description).

11540 DIAGNOSTIC END 12
Explanation: SG3 message. The sequence number of the last card read is in error. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must correct the control deck and rerun the job.

11541 ENTER $3P OR $3S
Explanation: The preceding error (11540 message) is not critical. The operator must now indicate whether the system should proceed with or invalidate the run.
Action: If the system should proceed with the run, perform the following:
1. Press INQUIRY REQUEST.
2. Enter $3P. This will cause the SG3 program to ignore the invalid control card and proceed with the run.
3. Press INQUIRY RELEASE.

If the system should invalidate the run, perform the following:
1. Press INQUIRY REQUEST.
2. Enter $3S. This will cause the SG3 program to halt normal processing, check the remaining control cards for errors and indicate the errors on the SPR, and terminate the run.
3. Press INQUIRY RELEASE.

11544
Explanation: SG4 message. The input tape has a read error that cannot be corrected. UNCORRECTABLE ERROR ON SIU is written on the SPR. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must rerun the job with a new input tape.

11545
Explanation: SG4 message. The tape file indicated in the accompanying SPR message has a read or write error that cannot be corrected. UNCORRECTABLE ERROR ON Mxy appears on the SPR; "xy" can be either W1, W2, or GO (i.e., MW1, MW2, or the Go file). Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: If the error is on MW1 or MW2, the user must rerun the job with a new tape. If the error is on the Go file, the user should rerun the job with a backup MGO file.

11546
Explanation: SG4 message. The output file produced is larger than the maximum allowed. FILE CAPACITY EXCEEDED is written on the SPR. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must shorten the input file and rerun the job.

11547
Explanation: SG4 message. The capacity of SG4 (199 program modules) has been exceeded. DIRECTORY CAPACITY EXCEEDED is written on the SPR. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must reduce the number of program modules to 199 or less and rerun the job.

11548

Explanation: SG4 message. MW1 or MW2, as indicated in the message written on the SPR, has not been assigned as a tape file, as required by SG4. MWx NOT ASSIGNED TO TAPE ("x" is either 1 or 2) is written on the SPR. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must reassign MW1 or MW2, as required, and rerun the job.

11549

Explanation: SG4 message. The "n" in the SPR message "n BAD INPUT CARD **** (contents of card)" indicates the type of error, as follows:

VALUE OF "N"	TYPE OF ERROR
0	Format
1	Sequence
2	TITLE card
3	Duplicate entry
4	GENER card
5	Control card missing
6	Module missing on Go file, or no Go file found

Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: The user must correct the card in error or supply the required card and rerun the job.

11551 FILE START RCD xxxxxx, LAST RCD yyyyyy
Explanation: System Generation Disk Loader message. This message indicates the beginning and end of the disk area occupied by the Master file, System Generator file, or System Operating File. "xxxxxx" and "yyyyyy" are the disk record addresses marking the beginning and end of the disk area: the first four characters of each constitute the track number; the last two characters are a record address identifier.
Action: None required.

11552 RLIB START RCD xxxxxx, LAST RCD yyyyyy
Explanation: System Generation Disk Loader message. This message indicates the beginning and end of the disk area occupied by the Relocatable Library. "xxxxxx" and "yyyyyy" are the disk record addresses marking the beginning and end of the disk area; the first four characters of each constitute the track number; the last two characters are a record address identifier.
Action: None required.

11553 MAC LIB OVFLO
Explanation: System Generation Disk Loader message. The Macro Library Directory is full (238 elements) and succeeding Macro elements are lost.
Action: No operator action is possible.

11554 INVALID FILE, NO DIR 1 REQUEST
Explanation: System Generation Disk Loader message. Directory 1 is missing and thus the system cannot operate. Execution halts.
Action: The user must correct the control deck (a 1 in column 61 of the Linkage Loader PHASE card requests Directory 1) and rerun the job.

11555 NO TAPE LABEL FOUND
Explanation: System Generation Disk Loader message. A word mark in location 00000 indicated that the Library tape would have a tape label; no tape label was found. Execution halts.
Action: The user must provide the tape label and rerun the job.

11556 NO RLIB HEADER FOUND
Explanation: System Generation Disk Loader message. The tape designated as the Relocatable Library by the character entered in 00000 does not contain the Relocatable Library header. Execution halts.
Action: The user must provide the necessary header for the tape and rerun the job.

11557 RLIB START RCD xxxxxx, LAST RCD yyyyyy
Explanation: System Generation Disk Library Loader message. This message indicates the beginning and end of the disk area occupied by the Relocatable Library. "xxxxxx" and "yyyyyy" are the disk record addresses marking the beginning and end of the disk area; the first four characters of each constitute the track number; the last two characters are a record address identifier.
Action: None required.

11558 REPLACE MW3 WITH SCRATGH TAPE – ENTER $50
Explanation: SG5 message. This message appears when the DMIN parameter is used on the Monitor control card. It indicates that the program is ready for a work tape to be mounted.
Action:
1. Replace the modification tape with a work tape.
2. Press INQUIRY REQUEST.
3. Enter $50 on the console to discontinue the waiting loop.
4. Press INQUIRY RELEASE.

11559

Explanation: SG5 message. An error occurred during the execution of the SG5 program. The exact nature of the error is indicated on the SPR. Execution halts. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
Action: No operator action is possible. The necessary action the user must take varies according to the message on the SPR. Consult *System Generation* for a complete list of the SPR messages that may appear; the explanation of each message and the suggested corrective action are also included.

11560 UPDATE SIU ON MW1
Explanation: SG5 message. This message indicates end of job and gives the location of the new SIU.
Action: None required.

11562 CREATLIB NOT ON SOF
Explanation: SG1-SG2 (disk-oriented system) message. SG1 has been executed, but the Create Library is not on the system. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must generate a new SOF that includes the Create Library; this SOF must be used in the processing of the job in which the message occurred.

11563 PACKAGE xxxxxxxxxx NOT IN CREATLIB
Explanation: SG1-SG2 (disk-oriented system) message. No packet of the name "xxxxxxxxxx" has been found by SG1 in the Create Library. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user should check the control deck to be sure that the spelling on the CREAT card is correct. After the correction is made, rerun the job.

11564 OUTPUT ON xxx
Explanation: SG1-SG2 (disk-oriented system) message. "xxx" is the x-control field for the unit on which the new output file is located. Execution continues.
Action: None required.

11565 DISK LOADER NOT PRESENT
Explanation: SG1-SG2 (disk-oriented system) message. IBSGDL has not been included or generated as the first item on the System file. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must rerun the job including IBSGDL.

11566 NO SYSGEN END CARD
Explanation: SG1-SG2 (disk-oriented system) message. The SG program did not encounter an END card. The program processes the last card read as if it were followed by an END card. Execution continues.
Action: None required if all other cards are in order. If the cards are not in the correct order, an error message will result; the user should then check the control deck, place the cards in the proper order, insert the END card, and rerun the job.

11567 CHECK CONTROL DECK
Explanation: SG1-SG2 (disk-oriented system) message. A System Generation control card is placed where none is expected, or a control card is not where it should be (e.g., a LOCATM card followed by a DELETR card). Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must correct the control deck and rerun the job.

11568
Explanation: SG1-SG2 (disk-oriented system) message. A macro routine or a model statement has been specified, but does not appear on the System file. The questionable reference is printed on the SPR. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user should check the control deck. The input to SG1 may be out of sequence. After the correction is made, rerun the job.

11569 SEQERR-xxxxx
Explanation: SG1-SG2 (disk-oriented system) message. A macro-statement sequence number with a low-order blank or an out-of-order sequence number has been encountered on the SIU. "xxxxx" is the name of the macro statement. Execution continues, but the statement in question is omitted from the library and is printed on the SPR.
Action: The user should check the control deck.

11570 NO ALTERNATE LIBRARY HEADER
Explanation: SG1-SG2 (disk-oriented system) message. SG2 has been directed to find an external library, but did not find the identifying header record on LIB. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The tape is probably the wrong reel. Mount the correct reel and begin again.

11571 MODULE xxxxxxxxxx NOT ON GO FILE
Explanation: SG1-SG2 (disk-oriented system) message. This message occurs during a library maintenance operation. The subprogram named "xxxxxxxxxx" was not immediately available on the SIU and was not found on the Go file. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user must check the control deck. The subprogram name may have been mispunched. After the correction is made, rerun the job.

11572 xxxxxxxxxx NOT AVAIL
Explanation: SG1-SG2 (disk-oriented system) message. An INCLD card has specified the name of an item that is not in the system. Execution halts. A special end-of-program condition is set, and control returns to the System Monitor.
Action: The user should check the control deck for the proper spelling of the item name, correct the card in error, and rerun the job.

11573 xxxxxxxxxx NOT VALID
Explanation: SG1-SG2 (disk-oriented system) message. An INCLD card has specified the name of an item that does not contain valid program information. The area assigned to the SOF (on the disk) has been accidentally altered or destroyed.
Action: The user must reload the SOF from the output tape of the previous System Generation run.

11574 SG2 CTL CARD OR I/O ERROR
Explanation: An uncorrectable I/O error has occurred. The problem may be caused by erroneous system generation control cards.
Action: Check the desk and rerun.

20101 cu
Explanation: IOCS has cycled back to the tape assigned as the base unit. "cu" is the channel and unit of the tape. IOCS is now in a waiting loop to permit the operator to mount the next reel.
Action:
1. Mount the next reel.
2. Press INQUIRY REQUEST.
3. Enter $8C on the console.
4. Press INQUIRY RELEASE.

20102 NOT FOUND CHKPT
Explanation: The Restart routine is unable to find the requested checkpoint on the tape currently mounted for the Core Image file. The routine has entered the Resident Monitor's Wait-Loop routine.
Action: If a wrong tape was mounted, perform the following:
1. Mount the correct reel.
2. Press INQUIRY REQUEST.
3. Enter $50 on the console.
4. Press INQUIRY RELEASE.

20103 INVALID CHKPT
Explanation: The requested checkpoint has been located by the Restart routine, but not all of its records are on this reel. (A tape mark or end-of-reel marker was detected while reading the records.) A restart cannot be made from this checkpoint. The Restart routine

has entered the Resident Monitor's Wait-Loop routine.
Action: To break the waiting loop and initiate normal end-of-program procedures, perform the following:
1. Press INQUIRY REQUEST.
2. Enter $50 on the console.
3. Press INQUIRY RELEASE.

20104 UNCORRECTABLE ERROR
Explanation: Read error on one of the checkpoint records. (Ninety-nine unsuccessful reads have been performed.) The Restart routine has entered the Resident Monitor's Wait-Loop routine.
Action: To break the waiting loop and initiate normal end-of-program procedures, perform the following:
1. Press INQUIRY REQUEST.
2. Enter $50 on the console.
3. Press INQUIRY RELEASE.

20105 cu
sssss
fileident
rrrr
abcde
Explanation: The Restart routine is about to position each tape for which this message is given. The routine has entered the Resident Monitor's Wait-Loop routine. "cu" specifies the channel and unit of each tape. The other parts of the message are taken from the File Table Extensions in the program being restarted; they specify tape label information and are present only for tapes using standard labels.

"sssss"	is the file serial number
"fileident"	is the file identification
"rrrr"	is the reel sequence number
"abcde"	are the label indicators (specifying label fields to be checked by IOCS).

Action: Check to ensure that the correct tapes are mounted. To break the waiting loop and continue the restart, perform the following:
1. Press INQUIRY REQUEST.
2. Enter $50 on the console.
3. Press INQUIRY RELEASE.

20111 cu
Explanation: The IOCS has cycled back to the 1311 physical unit assigned as the base unit. The "c" specifies the channel, @ or *, and the "u" specifies the 1311 disk drive number times two, i.e., 0, 2, 4, 6, or 8. The IOCS will be in a waiting loop until the operator mounts the next 1311 disk pack.
Action:
1. Mount the next 1311 disk pack.
2. Press INQUIRY REQUEST.
3. Enter $8C on the console.
4. Press INQUIRY RELEASE.

20301 (field)
(assumed value)
Explanation: The tape sort or merge program or the disk sort program has detected an error or inconsistency in the control data supplied. If the operator takes the option to continue the program, the "field" in the message is altered to the "assumed value" shown in the message.
Action:
1. Press INQUIRY REQUEST.
2. To accept the "assumed value" and continue execution, enter $31 on the console. To reject the "assumed value" and terminate the execution, enter $32 on the console.
   NOTE: If execution is terminated, the program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed; if the system is not in TEST mode, the Monitor skips to the next JOB card.
3. Press INQUIRY RELEASE.

20302 N GREATER THAN NMAX
Explanation: The file size specified by the user for the tape sort or merge program or the disk sort program is greater than the estimated maximum. If the operator takes the option to continue the program, the sort may or may not be successfully completed.
Action:
1. Press INQUIRY REQUEST.
2. To continue the sort, enter $31 on the console. To terminate the execution, enter $32 on the console.
   NOTE: If execution is terminated, the program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
3. Press INQUIRY RELEASE.

20303 REELCNT
Explanation: Control card information (REELCNT-99 parameter) for the tape sort or disk sort program indicated that the exact number of input reels are to be specified during execution of the program. The operator must now enter the number of reels to be sorted.
Action:
1. Press INQUIRY REQUEST.
2. Enter $31nn on the console ("nn" is the number of input reels to be sorted).
3. Press INQUIRY RELEASE.

20304 vvvvvvvvvv IS wwwwww – xxxxx – yyyyy – zzzzzzzz
Explanation: One or more possible control card errors were detected by the Tape Sort Definition program. The program continued execution to completion but there is a possibility that undesired results were achieved. The sort or merge program has been defined as follows:

vvvvvvvvvv	is the name assigned on the DSORT card by the user
wwwwww	is SORT or MERGE
xxxxx	is FIXED or VARIA
yyyyy	is UNMOD or MODIF
zzzzzzzz	is MULTI CF or ONE CF

After writing the message, the program will enter a waiting loop.
Action:
1. Press INQUIRY REQUEST.
2. If the program defined is acceptable and continued execution is desired, enter $31 on the console. If the program defined is not acceptable and further execution is not desired, enter $32 on the console.
3. Press INQUIRY RELEASE.

If $32 is entered, the program proceeds as with an uncorrectable error. The 00399- END SORT DEFINITION PROGRAM message is written on the SPR.
Typing of any digits other than $31 or $32 will not break the waiting loop.
NOTE: In a disk sort program, this message appears as follows:

20304- uuuuuuuuuu IS vvvvvvv, wwwwwwww, xxxxx, yyyyy, zzzzzzzz, where:
"uuuuuuuuuu" is the name assigned on the DSORT card by the user
"vvvvvvv" is TAPE IN or DISK IN

"wwwwwwww" is TAPE OUT or DISK OUT
"xxxxx" is FIXED or VARIA
"yyyyy" is UNMOD or MODIF
"zzzzzzzz" is MULTI CF or ONE CF
The same action described for the tape sort applies for the disk sort.

20311 xxxxxxx.yyyyyyy
Explanation: In reconciling the Phase 1 record count (yyyyyyy) against the file size specified by the user (xxxxxxx), the tape sort program found the sizes to be unequal. This might have been due to an incorrect file size being specified, operational failure, or the skipping of unreadable records (if the "skip" option had been specified).
Action:
1. Press INQUIRY REQUEST.
2. To accept the new record count (yyyyyyy) and continue processing, enter $31 on the console. To cause the sort program to be terminated as with a "cannot proceed" condition, enter $32 on the console.
3. Press INQUIRY RELEASE.
   NOTE: For a disk sort program, the corresponding message is 20311- RCD CNT OFF. "yyyyyyy" can be obtained from the corresponding message on the SPR. The explanation and action given for the tape sort apply for the disk sort.

20312 RCD CNT OFF
Explanation: Phase 1 data record counts do not balance.
Action:
1. Press INQUIRY REQUEST.
2. To accept the sort output record count and continue processing, enter $31 on the console. To terminate the execution, enter $32 on the console.
   NOTE: If execution is terminated, the program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
3. Press INQUIRY RELEASE.

20321 xxxxxxx.yyyyyyy
Explanation: In reconciling the record count at the end of a Phase 2 pass, the tape sort program found the output count (yyyyyyy) to be unequal to the input count (xxxxxxx). This may be due to operational failure or the skipping of unreadable records (if the "skip" option had been specified).
Action:
1. Press INQUIRY REQUEST.
2. To accept the new record count and continue processing, enter $31 on the console. To cause the sort program to be terminated as with a "cannot proceed" condition, enter $32 on the console.
   NOTE: If execution is terminated, the program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
3. Press INQUIRY RELEASE.

The typing of any digits other than $31 or $32 will not break the waiting loop.
NOTE: For a disk sort program, the corresponding console message is 20321- RCD CNT OFF. "xxxxxxx" and "yyyyyyy" can be obtained from the message on the SPR. The discrepancy may be due to operational failure. The remaining explanation and action given for the tape sort apply for the disk sort.

20331 xxxxxxx.yyyyyyy
Explanation: In reconciling the record count at the end of Phase 3 of a tape sort program, or at the end of a tape merge program, the output count (yyyyyyy) was found to be unequal to the input count (xxxxxxx). This may be due to an incorrect input file size being specified for the merge, operational failure, or the skipping of unreadable records (if the "skip" option had been specified).
Action:
1. Press INQUIRY REQUEST.
2. To accept the new record count and continue processing, enter $31 on the console. To cause the program to be terminated as with a "cannot proceed" condition, enter $32 on the console.
   NOTE: If execution is terminated, the program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job are executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
3. Press INQUIRY RELEASE.

The typing of any digits other than $31 or $32 will not break the waiting loop.
NOTE: For a disk sort program, the corresponding console message is 20331- RCD CNT OFF. "xxxxxxx" and "yyyyyyy" can be obtained from the message on the SPR. The discrepancy may be due to operational failure. The remaining explanation and action given for the tape sort apply for the disk sort.

20401 ENTER $3R, $3A, OR $3S
Explanation: During the execution of the File Save program, a disk read error occurred that cannot be corrected.
Action:
1. Press INQUIRY REQUEST.
2. To retry the input/output operation, enter $3R on the console. To accept the record as read, enter $3A on the console. To skip the record, enter $3S on the console.
3. Press INQUIRY RELEASE.
   NOTE: If the operator keys in $3A or $3S, the contents of the erroneous record are printed on the SPR.

20502 SUB FOR ss
Explanation: An ASGN card has been read for a physical unit that is currently unavailable. (The unit was made unavailable by a $B5ss console inquiry from the operator or by a SPOOL assignment.)
The "ss" is the assignment symbol of the unavailable unit.
Action:
1. Press INQUIRY REQUEST.
2. Enter $C1ss console inquiry, using an assignment symbol "ss" for an available unit. (This symbol must be different from the one included in the Monitor's message.)
3. Press INQUIRY RELEASE.
   NOTE: The $B6ss console inquiry cannot be used at this time to remove the unavailable indication from the unit named by the 20502 SUB FOR ss message.

20503 INV AIU END SITUATION
Explanation: An END card or end-of-file indication has been encountered on the Alternate Input Unit, but a return to the Standard Input Unit cannot be effected. (Possible cause: contents of Standard Input Unit input

area have been destroyed.) Transitional Monitor has entered a dead-end waiting loop.
Action: Reinitialization is necessary if batch is to be continued.

20504 INV B INQ
Explanation: An invalid console inquiry has been made while Transitional Monitor is ready to accept either class A or B messages. Monitor remains in waiting loop.
Action:
1. Press INQUIRY REQUEST.
   NOTE: If user option to include a HALT in the Wait-Loop routine was specified, operator must now press START.
2. Enter the valid message.
   (If none, enter $BX.)
3. Press INQUIRY RELEASE.

20574 PREPARE PTC FOR INITIAL LOAD
Explanation: Tele-processing Supervisor message. This message indicates that the operator should prepare the Program Transmission Control unit (PTC) on channel 1 for initial loading.
Action: On the PTC on channel 1:
1. Press STOP.
2. Press CLEAR.
3. Press LOAD.

20575 ERROR ON INIT LOAD-RESTART PTC
Explanation: Tele-processing Supervisor message. This message indicates that an error occurred during the loading of the PTC on channel 1.
Action: On the PTC on channel 1:
1. Press STOP.
2. Press CLEAR.
3. Press LOAD.

20576 PREPARE PTC FOR INITIAL LOAD
Explanation: Tele-processing Supervisor message. This message indicates that the operator should prepare the PTC on channel 2 for initial loading.
Action: On the PTC on channel 2:
1. Press STOP.
2. Press CLEAR.
3. Press LOAD.

20577 ERROR ON INIT LOAD-RESTART PTC
Explanation: Tele-processing Supervisor message. This message indicates that an error occurred during the loading of the PTC on channel 2.
Action: On the PTC on channel 2:
1. Press STOP.
2. Press CLEAR.
3. Press LOAD.

20580 TP DUMP FAILED—ENTER $3T TO KILL MSG FOR TP PROG xxxxx OR ENTER $3B TO KILL BATCH PROG.
Explanation: Tele-processing Supervisor message. The TP Supervisor has failed to put the dependent program, now being processed, on tape in order to process an interrupt. The installation can elect to process the interrupt and thus destroy the dependent program or to continue processing the dependent program and thus lose the interrupt. "xxxxx" is the name of the TP program needed.
Action:
1. Press INQUIRY REQUEST.
2. To process the TP interrupt, enter $3B on the console. To continue processing the dependent program, enter $3T on the console.
3. Press INQUIRY RELEASE.

20801 PAUSE xxxxx
Explanation: A FORTRAN object program has executed the instruction generated from a PAUSE source-program statement. As a result, the program has passed control to the Resident Monitor wait loop. "xxxxx" is the number assigned in the source program by the programmer. If no number has been assigned, "xxxxx" is 00000.
Action: To break the waiting loop and continue processing:
1. Press INQUIRY REQUEST key.
2. Enter $50 on the console.
3. Press INQUIRY RELEASE key.

21551 ENTER START RCD AND CYLS FOR FILE ACMTTTTH2 NN
Explanation: System Generation Disk Loader message. This message requests information from the operator on the location and size of the disk area for the Master file, System Generator file, or System Operating File being loaded.
Action:
1. Press INQUIRY REQUEST.
2. Enter the requested data in the format "acmtttthhznn", where:
   "a" is the access mechanism
   "c" is the channel
   "m" is the module
   "tttthh" is the disk geometric record address
   "z" indicates the action to be performed. To simply load the specified area, enter a blank for this position. To (a) format the area, (b) write HA2 and record addresses, and (c) load the area, enter a 1 (for 1301 Disk Storage) or 2 (for 1302 Disk Storage) in this position. If a 1 is entered, the specified area will be formatted in Load mode with a two-character HA2, a six-character record address, and a 2,165-character data record. If a 2 is entered, the specified area will be formatted in Load mode with a two-character HA2, a six-character record address, a 2,165-character data record, a second record address (one higher than the first), and a second 2,165-character data record.
   "nn" is the number of cylinders to be used for the file
3. Press INQUIRY RELEASE.

21552 FILE XCDS CYL LGTH, PRESS START TO CONT.
Explanation: This message, produced by the System Generator Disk Loader program, indicates that the number of cylinders allotted to the Master file, System Generator file, or System Operating File is too small.
Action: If the disk format permits, the file can be continued by pressing START. If not, change the format and re-execute the program with a larger number of cylinders specified in the 21551 message.

21553 ENTER START RCD AND CYLS FOR RLIB ACMTTTTH2 NN
Explanation: System Generation Disk Loader message. This message requests information from the operator on the location and size of the disk area for the library being loaded.
Action:
1. Press INQUIRY REQUEST.
2. Enter the requested data in the format "acmtttthhznn", where:
   "a" is the access mechanism
   "c" is the channel

"m" is the module
"tttthh" is the disk geometric record address
"z" indicates the action to be performed. To simply load the specified area, enter a blank for this position. To (a) format the area, (b) write HA2 and record addresses, and (c) load the area, enter a 1 (for 1301 Disk Storage) or 2 (for 1302 Disk Storage) in this position. If a 1 is entered, the specified area will be formatted in Load mode with a two-character HA2, a six-character record address, and a 2,165-character data record. If a 2 is entered, the specified area will be formatted in Load mode with a two-character HA2, a six-character record address, a 2,165-character data record, a second record address (one higher than the first), and a second 2,165-character data record.
"nn" is the number of cylinders to be used for the file

3. Press INQUIRY RELEASE.

21554 RLIB XCDS CYL LGTH, PRESS START TO CONT.

Explanation: This message, produced by the System Generator Disk Loader program, indicates that the number of cylinders allotted to the library is too small.

Action: If the disk format permits, the file can be continued by pressing START. If not, change the format and re-execute the program with a larger number of cylinders specified in the 21553 message.

30101 cu

Explanation: One or more fields in header label of input tape do not match field(s) in dependent program's file table. Possible fields: creation date, file name, file serial number, reel sequence number. "cu" is channel and unit of tape.

Action: The IOCS can be directed to accept the tape or to retry the label check with a different reel mounted.

1. Press INQUIRY REQUEST.
2. Retry: enter $8R on the console.
   Accept: enter $8A on the console.
3. Press INQUIRY RELEASE.

30102 cu

Explanation: The header label of the output tape indicates that contents of the tape should not be destroyed. "cu" is channel and unit of tape.

Action: The IOCS can be directed to accept the tape or to retry the label check with a different tape mounted.

1. Press INQUIRY REQUEST.
2. Retry: enter $8R on the console.
   Accept: enter $8A on the console.
3. Press INQUIRY RELEASE.

30111 cu

Explanation: One or more fields in the input 1311 header label do not match the field(s) in the dependent program's file table. The fields are: creation date, file identification, file serial number, and physical unit sequence number. The "c" specifies the channel and the "u" specifies the 1311 drive number times two.

Action: The IOCS can accept the disk pack or can retry the label check with a different disk pack mounted.

1. Press INQUIRY REQUEST.
2. Retry: enter $8R on the console.
   Accept: enter $8A on the console.
3. Press INQUIRY RELEASE.

30112 cu

Explanation: The header label of the output 1311 disk pack indicates that the contents of the disk pack should not be destroyed. This message can also indicate that one of the following fields of the header label does not match the corresponding field in the file table of the dependent program. The fields are: file identification, file serial number, and physical unit sequence number. The "c" species the channel and the "u" specifies the 1311 drive number times two.

Action: The IOCS can be directed to accept the disk pack or to retry the label check with a different disk pack mounted.

1. Press INQUIRY REQUEST.
2. Retry: enter $8R on the console.
   Accept: enter $8A on the console.
3. Press INQUIRY RELEASE.

30301-(columns 16 through 20 of card)

Explanation: The tape sort or merge program or the disk sort program has read a control card that does not contain the identification "SORTb" in columns 16 through 20 and, therefore, may not be a sort control card. The operator has the option to accept the card, terminate execution of the program, or bypass the card and continue execution.

Action:

1. Press INQUIRY REQUEST.
2. To accept the card and attempt to process it, enter $31 on the console. To terminate the execution, enter $32 on the console. To bypass the card and attempt to continue execution of the program, enter $33 on the console.
   NOTE: If execution is terminated, the program gives control to the Resident Monitor's End-of-Program routine. If the system is in TEST mode, subsequent runs within the job will be executed. If the system is not in TEST mode, the Monitor skips to the next JOB card.
3. Press INQUIRY RELEASE.

30501 TWO ADDITIONAL DATA OVERFLOW TRACKS REQUIRED

Explanation: The Add phase of the File Organization System program has determined that further addition of records may cause an overflow. A waiting loop has been entered. A minimum of two additional data overflow tracks should be provided to ensure successful completion of the phase. If additional areas are not provided, addition of further records may cause the program to terminate unconditionally.

Action:

1. Press INQUIRY REQUEST.
2. To provide additional overflow areas, enter $3xcamttttthheeee on the console, where:
   "x" is any character
   "c" is the channel (1 for channel 1, etc.)
   "a" is the access arm
   "m" is the module
   "tttt" is the beginning track address
   "hh" is the home address
   "eeee" is the ending track address
   To continue record addition without providing an additional overflow area, enter $3xb, where:
   "x" is any charaeter
   "b" is blank
3. Press INQUIRY RELEASE.

30502 n ADDITIONAL INDEX OVERFLOW TRACKS REQUIRED

Explanation: Index adjustment during record addition has created the potential of an index overflow. To pro-

tect existing records, execution of the Add program has heen suspended and a waiting loop has been entered. An additional index overflow area must be provided if record addition is to be resumed. The "n" in the console message indicates the number of tracks required for the additional area.

Action:

1. Press INQUIRY REQUEST.
2. To provide additional area, enter $3xamtttthhamtttthh on the console, where:
   "x" is any character
   "a" is the access arm
   "m" is the module (beginning track)
   "tttt" is the track address (beginning track)
   "hh" is the home address (beginning track)
   The second amtttthh stands for similar disk control information for ending track.
   NOTE: No channel is specified in the message reply. The channel is the same as that originally specified for the File Directory and Index area on the SYSDF card at System Gencration.
   To terminate execution, enter $3xb on the console, where:
   "x" is any character
   "b" is blank
3. Press INQUIRY RELEASE.

30503 ADDRESS VERIFICATION

Explanation: Because of the importance that any disk area assigned at the console be an available area, this File Organization System message always appears after the reply to message 30501 or 30502 has been entered. The message allows for visual verification of the preceding entry, and provides for final confirmation by the operator.

Action:

1. Press INQUIRY REQUEST.
2. If the previously entered area assignment is correct, enter $3xYES on the console. If the previously entered area assignment is in error, enter $3xNO on the console. "x" can be any character.
3. Press INQUIRY RELEASE.
   NOTE: If the reply to this message was $3xNO, the preceding message (30501 or 30502) will again appear at the console printer. This sequence will continue until the reply $3xYES is given to message 30503.

91556 RLIB XCDS DISK AREA

Explanation: System Generation Disk Library Loader message. The Relocatable Library is too large to be loaded into the disk area assigned as LIB. Processing halts. A special end-of-program condition is set, and control returns to the System Monitor.

Action: The user must increase the size of the disk area assigned to LIB, or reduce the size of the Relocatable Library, and rerun the job.

91558 NO RLIB HEADER FOUND

Explanation: System Generation Disk Library Loader message. Neither of the first two tape records was a Relocatable Library header. Processing halts. A special end-of-program condition is set, and control returns to the System Monitor.

Action: The user must provide the necessary header and rerun the job.

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Printed in U.S.A. C28-0351-5

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